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MARKETING KENTUCKY LIVESTOCK

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BULLETIN NO. 278

Marketing Kentucky Livestock

By E. C. JOHNSON

The purpose of this bulletin is to describe and analyze the methods used in marketing Kentucky livestock. Since this study covers a broad field it does not go into detailed economic analysis of marketing agencies but aims to bring out significant facts, and point out specific problems relating to marketing of Kentucky livestock.

TRENDS IN LIVESTOCK PRODUCTION IN KENTUCKY

The number of livestock on farms for census years from 1850 to 1925 is given in Table 1. Table 2 shows the rank of Kentucky among states in number of livestock on farms, and indicates that Kentucky now ranks much lower than formerly. This is due largely to the development of the livestock industry in other states and not to a decline of livestock in Kentucky because, with the exception of hogs, there has been a tendency for livestock on farms in Kentucky to increase.

The hog industry of Kentucky increased rapidly in importance during the first half of the nineteenth century, but since 1860 the trend has been downward. Figure 1 shows the number of hogs on farms on January first each year since 1870, based on the estimates of the United States Department of Agriculture, and shows a marked decline of hogs on farms during this period.

Central Kentucky has been an important sheep producing region for a long period of years. Census figures since 1850 show that the number of sheep on farms has been approximately one million except for the years 1900 and 1910 when there was a marked increase. The 1920 census reported only 707,845 head

and the 1925 census, 695,692 head, but it should be pointed out that these census figures were for January first and therefore did not include the lamb crop. The 1910 census is a report for April 15 and others are for June 1. Figure 1 shows the number of sheep on farms since 1870 and indicates that the trend of the sheep industry has been slightly upward.

TABLE 1.—Number of Livestock on Farms in Kentucky.
Report of U. S. Census.

Year	Hogs	Sheep	Cattle*	Dairy Cows	Horses	Mules
1850	2,891,163	1,102,091	505,037	247,475	315,682	65,609
1860	2,330,595	938,990	566,844	269,215	355,704	117,634
1870	1,838,227	936,765	450,722	247,615	317,034	99,230
1880	2,225,225	1,000,269	542,092	301,882	372,648	116,153
1890	2,036,746	937,124	701,575	364,516	401,356	146,521
1900	1,954,537	1,297,343	719,223	364,025	451,697	190,665
1910	1,491,816	1,363,013	591,103	409,834	443,034	225,043
1920	1,504,413	707,845	652,107	441,346**	382,442	292,857
1925	919,304	695,962	472,103	432,880**	307,163	294,069

*Cattle excluding dairy cows.
**Dairy cows and dairy heifers.

TABLE 2.—Rank of Kentucky Among States in Livestock on Farms.

Year	Hogs	Sheep	Cattle*	Dairy Cows	Horses	Mules
1850	2	6	10	9	4	2
1860	5	7	11	10	7	2
1870	4	10	11	11	9	3
1880	7	14	16	14	11	8
1890	9	14	19	14	15	6
1900	11	16	21	14	16	7
1910	14	14	24	18	18	8
1920	14	17	28	15	20	9

*Cattle excluding dairy cows.

TABLE 3.—Number of Livestock Per Farm in Kentucky—1910-1920.
(U. S. Census)

Class of Livestock	1910—Farms Reporting Livestock		1920—Farms Reporting Livestock	
	Per Cent of All Farms	Average Head Per Farm	Per Cent of All Farms	Average Head Per Farm
All cattle	85.1	4.5	85.5	4.7
Dairy cows	83.4	1.6	76.1	2.1
Hogs	66.7	8.6	69.5	8.0
Sheep	17.6	29.8	13.2	19.8
Horses	67.9	2.5	67.0	2.1
Mules	37.7	2.3	45.8	2.4

TABLE 4.—Average Number of Livestock Per Farm by Districts.
(U. S. Census 1925)

District	Beef Cattle	Dairy Cows	Hogs	Sheep	Horses	Mules
Mountain	1.6	1.4	2.5	.4	.7	.9
North Central	2.0	2.8	3.8	7.6	1.8	.7
West Central	1.8	1.6	3.7	1.5	1.1	1.4
South Western	1.6	2.3	5.2	1.3	1.2	1.9
Western Coal Field	1.7	1.3	4.8	.7	1.3	1.8
Purchase	1.1	1.9	4.0	.6	1.2	1.7

TABLE 5.—Average Number of Livestock Per Thousand Acres of all Land in Farms.
(Census of 1920)

	Ohio	Indiana	Illinois	Tennessee	Kentucky	Virginia
All cattle	82	73	87	60	51	41
Hogs	131	178	145	94	70	51
Sheep	89	31	20	19	33	18
Horses and mules	36	39	46	35	31	22

In beef cattle Kentucky made a steady growth between 1850 and 1920 but since 1920 beef cattle on farms have decreased. Dairying has shown the most noticeable growth among all livestock enterprises in the State. Figure 2 giving the number of milk cows and other cattle on farms illustrates graphically the upward trend in the beef and dairy industry.

The number of horses on farms has not changed to any great extent since 1850 but mules have shown a large increase. Between 1850 and 1920 horses increased 21 per cent and mules 346 per cent showing that mules have been gaining in relative importance as farm draft animals. The trend of horses and mules in Kentucky is shown in Figure 3.

DISTRIBUTION OF LIVESTOCK WITHIN THE STATE

The census of 1920 reported 270,626 farms in Kentucky and of these 253,144 or 93.5 per cent reported some livestock. The average number of head of livestock per farm as reported by the 1910 and 1920 census is given in Table 3.

The practice often is followed of dividing the State into six regions. They are the Purchase, Southwestern, Western Coal Field, West Central, North Central and Mountain regions. The location of these regions is shown in Figure 4, which also shows the distribution of sheep. Table 4 shows the average number of head of livestock per farm for all farms in the different regions.

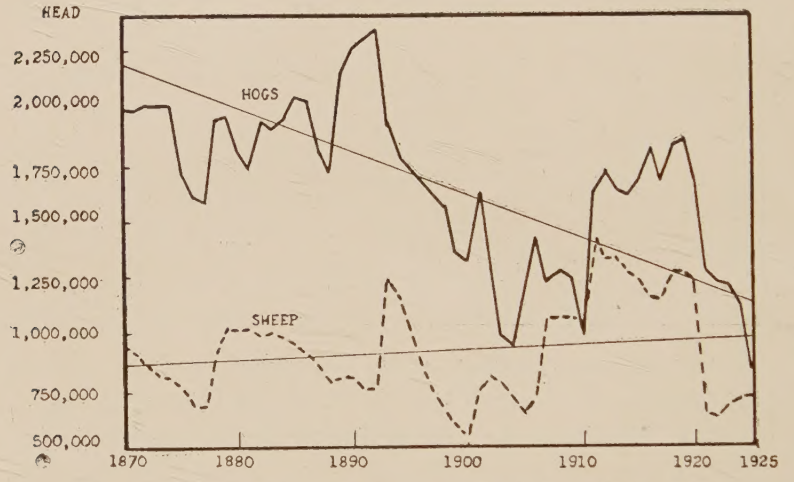

Fig. 1.—Hogs and sheep on farms in Kentucky. 1870 to 1925.

The western part is the most important hog producing section of Kentucky but hogs are fairly well distributed over the whole State. There is considerable concentration of hogs in counties bordering the Ohio River in Western Kentucky, and in hogs per farm, the Southwestern region stands in first place.

Sheep production is more localized than any other form of livestock production. Figure 4 shows, that the sheep on farms are concentrated in a number of counties in the North Central region. This region has approximately 65 per cent of the sheep in the State and is famous for the production of high quality spring lambs.

While beef cattle are distributed over the whole State, the main center of beef production is in a few counties in the North

Central region. The excellent bluegrass pastures of this region furnish much of the necessary feed, and are a prominent factor in making this an important beef producing area. The Mountain region is second in beef production.

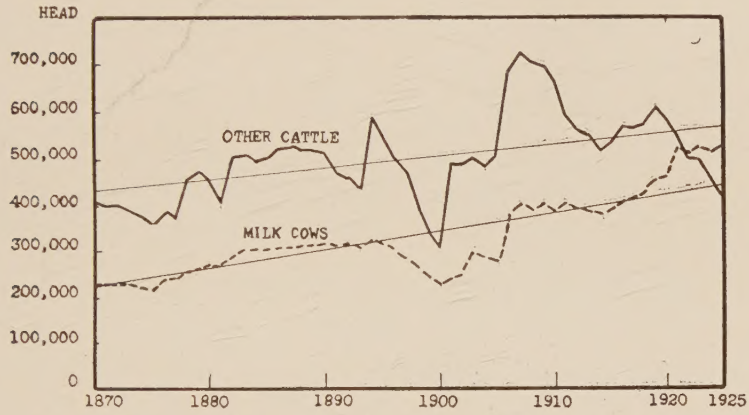

Fig. 2.—Milk cows and other cattle on farms in Kentucky. 1870 to 1925.

The most important dairy regions of Kentucky are in the proximity of Louisville, Cincinnati and Lexington, where farms produce milk to supply the city market. In dairy cattle per

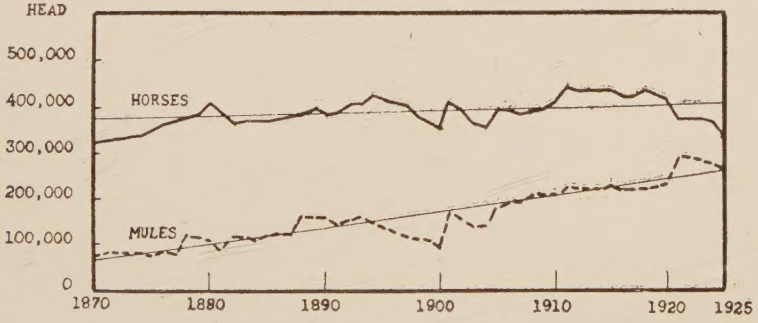

Fig. 3.—Horses and mules on farms in Kentucky. 1870 to 1925.

farm the North Central region leads, with the Southwestern section in second place.

Mules outnumber horses in all sections of Kentucky except the North Central region, and are most numerous in the western

Fig. 4.—Sheep on farms in Kentucky. Each dot represents 1,000 head according to 1920 census.

part. In horses per farm, the North Central region leads, which is explained partly by the fact that the breeding of thorobred horses is an important enterprise in that region.

In comparing the livestock industry of Kentucky with that of neighboring states of Ohio, Illinois, Indiana, Tennessee and Virginia, Kentucky ranks fifth in all cattle per thousand acres of land in farms in 1920, fifth in hogs, second in sheep and fifth in horses and mules. These figures are given in Table 5. In number of livestock per thousand acres of improved land in farms, Kentucky ranks fourth in cattle, fifth in hogs, second in sheep and third in horses and mules.

SEASONAL MOVEMENT OF LIVESTOCK TO MARKET

In order to determine the movement of Kentucky livestock to market during the different months of the year, a study was made of receipts of Kentucky livestock at the Cincinnati and Louisville markets, which are the most important markets for livestock from this State. Receipts for a five year period, 1921

TABLE 6.—Seasonal Movement of Cattle.

Receipts by Months Expressed as Per Cent of Year's Total.
(Average of receipts for five years 1921-1925)

Months	Cincinnati		Louisville		Louisville and Cincinnati
	Total Cattle Receipts	Receipts of Kentucky Cattle	Total Cattle Receipts	Receipts of Kentucky Cattle	Kentucky Cattle Receipts
Jan.	7.9%	4.8%	6.8%	6.8%	5.6%
Feb.	5.6	2.5	5.5	5.4	3.7
Mar.	6.4	2.2	6.4	6.0	3.8
Apr.	6.0	1.9	5.6	5.3	3.3
May	6.5	3.3	5.8	5.6	4.3
June	6.5	4.2	5.8	6.0	4.9
July	8.0	9.2	8.1	8.3	8.8
Aug.	9.6	12.0	10.2	9.9	11.2
Sept.	11.0	16.9	14.3	13.3	15.4
Oct.	13.6	20.8	15.0	16.5	19.0
Nov.	10.3	14.3	9.8	10.0	12.5
Dec.	8.6	7.9	6.7	6.9	7.5

TABLE 7.—Seasonal Movement of Calves.

Receipts by Months Expressed as Per Cent of Year's Total.
(Average of receipts for five years 1921-1925)

Months	Cincinnati		Louisville		Louisville and Cincinnati
	Total Calf Receipts	Receipts of Kentucky Calves	Total Calf Receipts	Receipts of Kentucky Calves	Kentucky Calf Receipts
Jan.	5.8%	4.6%	5.8%	5.6%	5.0%
Feb.	6.4	5.1	5.7	5.9	5.5
Mar.	8.9	7.0	7.9	7.7	7.3
Apr.	10.2	8.4	7.9	7.7	8.0
May	11.3	11.2	8.9	8.9	10.0
June	10.8	11.5	10.4	10.5	11.0
July	10.4	12.9	11.7	12.0	12.5
Aug.	9.1	10.2	12.0	12.4	11.3
Sept.	7.9	10.1	10.3	10.4	10.3
Oct.	7.6	8.7	8.1	8.0	8.3
Nov.	5.8	5.5	5.7	5.7	5.6
Dec.	5.8	4.8	5.6	5.5	5.2

to 1925 inclusive, were studied and the average number of head of livestock of each class received per month for the five years was determined.

Both the Louisville and Cincinnati stockyard companies keep records of total receipts of livestock by months from different railroads, truck, express and boat, but these records do not show the points or origin of livestock shipments. The Ohio office of the agricultural statistician for the U. S. Department of Agriculture has figures on the receipts at Cincinnati from Kentucky points, which were used as a basis for determining seasonal movement to that market. The Kentucky office of the agricultural statistician provided figures on receipts of Kentucky sheep and lambs at Louisville, and estimates were obtained from the Bourbon Stock Yards Company for cattle, calves and hogs. It was estimated that the percentages of livestock of Kentucky origin for the different sources were as follows:

Louisville & Nashville R. R.—South	60 per cent
Louisville & Nashville R. R.—North	100 per cent
Illinois Central R. R.	100 per cent
Southern R. R.—South	100 per cent
Louisville, Henderson and St. Louis R. R.	100 per cent
Chesapeake and Ohio R. R.	100 per cent
Louisville and Interurban R. R.	100 per cent
Express, boat and driven in	60 per cent

This means that the figures are only estimates, but they are the best figures available. The seasonal movement of Kentucky livestock to market as determined from these figures is illustrated graphically in Figure 5.

Cattle. The marketing of Kentucky cattle is very seasonal, most of the cattle being sent to market in the fall with a very pronounced peak in the month of October. Table 6 which

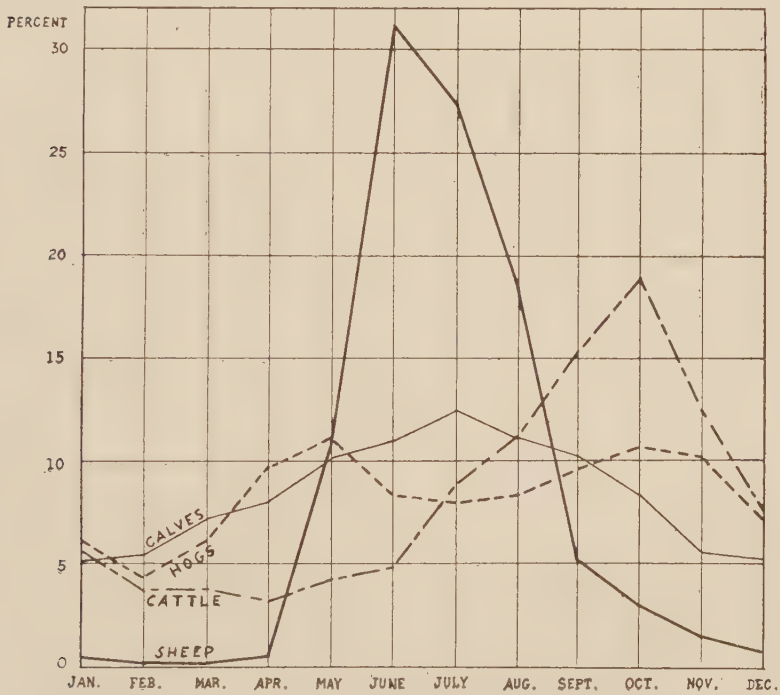

Fig. 5.—Monthly receipts of Kentucky livestock at Louisville and Cincinnati markets, expressed as per cent of year's total. Average of receipts for five years, 1921-1925.

gives the per cent of cattle marketed by months indicates that about 58 per cent of the Kentucky cattle received at Louisville and Cincinnati are marketed during the four months of August, September, October and November. The heavy marketing of cattle in the fall is due to the fact that cattle are run on pasture during the summer and early fall and then are sent to the market. Shipments of cattle in the fall are largely butcher and feeder stock and a few loads of fat cattle.

Calves. The marketing of calves is also seasonal but not so pronounced as with cattle. Table 7, giving the per cent of the year's receipts marketed each month, shows that about 56 per cent of the calves are marketed during the five months, May to September, the peak coming in July. The calves are usually

TABLE 8.—Seasonal Movement of Hogs.

Receipts by Months Expressed as Per Cent of Year's Total.
(Average of receipts for five years 1921-1925)

Months	Cincinnati		Louisville		Louisville and Cincinnati
	Total Hog Receipts	Receipts of Kentucky Hogs	Total Hog Receipts	Receipts of Kentucky Hogs	Kentucky Hog Receipts
Jan.	9.8%	5.6%	8.7%	6.6%	6.1%
Feb.	8.0	2.4	7.8	6.6	4.3
Mar.	7.5	4.5	8.2	8.2	6.2
Apr.	8.1	9.7	9.0	9.9	9.8
May	8.5	11.4	9.2	10.6	11.0
June	7.8	7.9	8.1	9.1	8.5
July	7.0	7.7	7.8	8.3	8.0
Aug.	6.9	8.2	7.6	8.7	8.4
Sept.	7.6	10.8	7.5	8.4	9.7
Oct.	9.4	12.8	8.2	8.4	10.8
Nov.	9.6	11.7	8.8	8.5	10.2
Dec.	9.8	7.3	9.0	6.7	7.0

born in the spring and early summer, which accounts for the fact that the marketing of veal calves is heaviest during those months.

Hogs. There are two peaks in the marketing of hogs, one in May and the other in October. The peak in May is caused

by the marketing of the big crop of the previous fall and also by the marketing of sows whose spring litters have been weaned. The peak in October is due to the marketing of the spring crop of pigs. With the exception of the months of January, February and March when the movement of hogs is light, the marketing of hogs is fairly uniform. The fairly heavy movement to market during the summer months indicates that many of the fall pigs and sows are held and fed over a relatively long period. (See Table 8).

TABLE 9.—Seasonal Movement of Sheep and Lambs.

Receipts by Months Expressed as Per Cent of Year's Total.
(Average of receipts for five years 1921-1925)

Months	Cincinnati		Louisville		Louisville and Cincinnati
	Total Sheep Receipts	Receipts of Kentucky Sheep	Total Sheep Receipts	Receipts of Kentucky Sheep	Kentucky Sheep Receipts
Jan.	1.4%	.5%	.4%	.3%	.4%
Feb.	.9	.2	.2	.2	.2
Mar.	1.2	.1	.4	.3	.2
Apr.	1.3	.4	1.1	.7	.6
May	8.3	9.2	13.0	12.9	10.9
June	24.2	27.2	35.0	36.0	31.2
July	22.4	25.0	29.2	30.7	27.6
Aug.	21.2	23.2	14.2	12.8	18.5
Sept.	8.9	6.6	3.9	3.4	5.1
Oct.	5.4	4.5	1.3	1.3	3.0
Nov.	2.9	2.1	.7	.8	1.5
Dec.	1.9	1.0	.6	.6	.8

Sheep and lambs. Sheep and lambs show the greatest seasonal movement of all classes of livestock. Spring lambs, which constitute the bulk of sheep and lamb shipments, are marketed almost entirely during the four months, May, June, July and August, with the peak usually in June. For the five-year period of 1921 to 1925, 31 per cent of the sheep and lambs were marketed in June and 27 per cent in July. Eighty-eight per cent of the movement of lambs to market took place during the four months mentioned. (See Table 9).

The figures given are average monthly receipts for the five year period 1921 to 1925 and consequently do not represent the marketing for any one year but do give the seasonal tendencies in the marketing of Kentucky livestock. While these figures are representative of the usual seasonal movement to market, there may be variations from year to year due to changes in weather and crop conditions and to variations in the price of feed and livestock.

MARKETING AT COUNTRY POINTS

The important function of the local market is to assemble the livestock for shipment to the central markets or slaughtering plants. If a farmer has sufficient livestock to make a carload he frequently will load and ship the livestock himself to the central market, but usually he has only a few head to sell at one time, and in that case he generally sells to a local livestock dealer. In Kentucky the most important buyers in the local market are the local traders or shippers, and the order buyers. Country butchers and local slaughtering plants also buy some livestock from the farmers, and, in Central Kentucky, local auction sales organizations have been developed. Cooperative livestock shipping has not become important in Kentucky up to the present.

Local traders. From the standpoint of volume of livestock purchased at local points, a local livestock dealer, generally spoken of as a trader, shipper or speculator, is the most important. The trader is a local man who buys livestock from farmers on his own account, assembles the livestock in carload lots, and usually sells thru commission firms in the central markets. At most shipping points there are several traders operating and competition for business is quite keen as a rule. A survey made of dealers at 26 representative shipping points in Kentucky showed a range of from 1 to 10 traders per shipping point with an average of 4. These men as a rule do not devote all their time to buying of livestock. Out of 40 traders interviewed only 8 were devoting all their attention to trading in livestock, 25 also were engaged in farming and 7 had other business interests. Most dealers buy livestock in one locality and ship from only one ship-

ping point, but a number buy over a larger territory and ship from several points.

Three methods of purchasing livestock are practiced among livestock traders, namely, purchase at the farm, by telephone, and at the shipping point, including purchases at auction and court day sales. The relative importance of these methods varies in different sections and with different classes of livestock. In some parts of Central Kentucky the local auction sales have practically replaced the purchase by farm visit and telephone, and traders buy much of their livestock at the auctions held at various shipping points. In other sections it is common practice for dealers to travel from farm to farm and buy livestock. The dealer likes to see the livestock before he makes a bid and therefore purchases at farms are important. This is especially true in the purchase of cattle and sheep because there is a wide range in grade, and the dealer does not want to make a bid without examining the stock. For hogs, grades are more uniform, and the buyer frequently makes offers over the telephone and closes a deal by that method. At some points buyers, generally in partnership, maintain private yards and scales and provide a continuous market for livestock. The farmer can then deliver livestock at any time convenient to him and sell at the yards. Buying is done on the basis of a certain margin below the central market prices, and in most sections is based on the markets of Louisville or Cincinnati.

The farmer makes delivery of livestock at the shipping point where it is weighed, and payment is made to him by the buyer. A survey made among dealers indicates that the capital required for purchases is supplied from the traders' own funds or from loans made by banks, and only in exceptional cases does the trader draw on commission firms in the central market. After buying the livestock the shipper assumes all risks due to price fluctuations between the time of purchase and sale in the central market.

The order buyer. The order buyer has become an important buyer in the local markets of Kentucky. He operates like the trader except that he buys not on his own account but on the

account of some packing plant which he represents, and receives a certain definite fee for his services, usually on the basis of a flat rate per car. As a rule the order buyer is a local man and, besides buying on order, may buy livestock on his own account.

With the growth of direct buying on the part of packers the order buyer has become very important in the purchase of fat lambs, calves and hogs. Very little direct buying of cattle is done except in the purchase of some loads of fat cattle sold by cattle feeders. At the auction sales of Central Kentucky the order buyer is especially important and it is estimated that during 1925 about 60 per cent of the lambs, 70 per cent of the hogs, 50 per cent of the calves and 5 per cent of the cattle sold at auction were bought by order buyers.

Indications are that direct buying by packers will continue to be an important factor in the marketing of Kentucky livestock and if the decentralization which is apparently taking place in the packing industry continues, may reach even greater proportions. Central markets, however, will receive much of the livestock, as these markets have been built around packers located there, and will continue to be a source for much of the livestock bought by the packers.

The country butcher. Country butchers are found in many towns in Kentucky. These include retailers of meat who kill a small amount of livestock for sale to the consumer, the livestock being purchased from the farmers. In some places there are also men who buy and kill livestock and sell to the retail merchant. The amount of livestock purchased from farmers by country butchers is small compared to the amount shipped to other markets and indications are that the country butcher as an outlet for livestock is declining in importance. Most retail meat merchants now obtain their meat supply from local packing plants or from the wholesale distributing houses of the large packers.

The local packing plant. The last few years have seen a marked growth in the local packing industry. New plants have sprung up at some points in Kentucky and old plants have in-

creased their volume of business, which has resulted in the local packing plant becoming an important buyer of livestock.

Towns having local packing plants of importance are Lexington, Owensboro, Henderson, Covington, Paducah and Bowling Green. The size of the business varies greatly. One of the larger plants during 1925 slaughtered 25,991 hogs, 1,513 cattle, 1,047 calves and 429 sheep, representing a total live weight of 6,920,085 pounds. For this livestock the firm paid $723,346.

Most of the livestock slaughtered at the local packing plants is bought in communities near the plant. Plants located at Lexington have their buyers at the local auction sales and get much of the livestock at the sales. Some is also shipped in from central markets. In other sections of the State the livestock is bought from farmers and local livestock dealers, and in addition occasional purchases are made in central markets. The prices paid are based on some central market; for example, the packing plant at Henderson in buying hogs bases its price on the Evansville market less a margin of 25 cents in Henderson County and 35 cents in Union and Webster Counties.

Auction sales.[1] In Central Kentucky a rather unique form of local livestock marketing has developed during the last four years, namely, the concentration and sale of livestock by auction. During the summer of 1926 there were 15 auction sales organizations located in 12 different towns, which held a sale of livestock one day every week and the total sales of these organizations amounted to several million dollars. A large share of the market livestock sold in this region now passes thru the sales, and buyers that formerly bought direct from farmers now buy most of their livestock by bidding at the auctions.

The auction sales organizations operate stock yards at the shipping point and the producer delivers the livestock which he wants to sell at the yards the morning of the sale day. The livestock is weighed and the hogs, calves and lambs graded and mingled in lots of uniform grade, cattle being sold separately for each consignor. The auction sale is held during the afternoon and bidding is active. All types of buyers previously men-

[1] See Kentucky Experiment Station Bulletin No. 270.

tioned compete at the sale, with order buyers, the most important buyers of lambs and hogs.

Auction sales organizations get their income by charging a commission fee per head for the livestock sold. This fee is deducted from the sale price and the balance paid to the producer. These fees are fairly uniform among organizations, the customary rates being 20 cents for sheep, lambs and hogs, and 50 cents for cattle and calves.

Grading livestock before selling has been an important factor in the success of the sales. The high grade spring lambs have attracted order buyers representing packers, who are in a position to pay premium prices not only for the lambs but also for high grade hogs and calves. Prices at sales have been within a narrow margin of the Cincinnati market and producers generally have been satisfied with the prices obtained. It is likely that the auction sales organizations will continue in the future to function as private concentration yards where livestock will be assembled and part of it sold for direct shipment to packers.

Court day sales. Trading in livestock at county court days was of considerable importance during former years in Kentucky. In many counties of the State monthly court day sales were held at the county seat, and these furnished an opportunity for farmers to bring in livestock and sell to livestock buyers who attended the sales. The livestock was sold either by auction or by private sale. With the development of transportation and central livestock markets, the county court day livestock sales declined in importance, and at the present time, with the exception of a few counties near the western edge of the mountains, the amount of livestock sold at court day is relatively small. A few counties, however, still have court day sales where considerable livestock is sold. These counties border the mountains and cattle from mountain counties are driven in from long distances to be sold. Court days at Mt. Sterling and Richmond stand out as being of greatest importance in amount of livestock sold. At these points during the fall months it is not uncommon to find

over three thousand head of cattle on hand to be sold at one court day sale.

Cooperative livestock shipping associations. Marketing livestock thru local cooperative shipping associations has never made much headway in Kentucky. Producers generally have not taken sufficient interest in cooperative shipping to organize shipping associations on any wide scale. This lack of interest can be explained partly by the fact that Kentucky livestock producers as a rule have been fairly well satisfied with the services of the local livestock dealers. In the Middle West where cooperative livestock shipping has made the greatest growth, a feeling of distrust toward the dealer was prevalent among farmers in many communities. Such a feeling of distrust does not exist generally in this State.

At no time has there been over half a dozen active shipping associations in Kentucky. Sometimes farmers will consolidate livestock for a carload shipment to the central market without the aid of a definite organization, but even this practice is not carried on to any great extent. From reports obtained there are three organizations which were active in 1926. These are the associations at Franklin, Barlow and in Union County.[1]

The plan of cooperative livestock shipping is for farmers to group their livestock in carload lots to be sold at the central market, each producer receiving a return equal to the amount his livestock sold for less the cost of marketing.[2]

Livestock slaughtered on farms. There is a considerable amount of livestock slaughtered on farms in Kentucky. In the 1919 census 12,293 farms reported cattle and calves slaughtered, 206,113 reported hogs and 5,023 sheep. The total number of head slaughtered on farms during 1909 and 1919 is given in Table 10. From the standpoint of number slaughtered, hogs are by far the most important, the census reporting 721,263 head slaughtered in 1919. Cattle are second with 19,984 head, and sheep and lambs third, with only 9,503 head. According to the census reports the practice of slaughtering animals on farms

[1] An association was organized at Lancaster in the Spring of 1927.
[2] See Kentucky Extension Circular 104 for a discussion of cooperative shipping associations.

is declining in importance, there being a decrease of 3,573 head of cattle and calves, 12,379 hogs and 1,147 sheep and lambs in 1919 as compared to 1909. While most of the animals slaughtered are for consumption on farms, the 1919 census reported the sale of 2,812,584 pounds of beef and veal, 5,627,480 pounds of pork products and 149,519 pounds of lamb and mutton.

TABLE 10.—Animals Slaughtered on Farms in Kentucky as Reported by U. S. Census.

	Cattle and Calves	Hogs	Sheep and Lambs
1909	23,557	733,642	10,650
1919	19,984	721,263	9,503
Decrease in 1919	3,573	12,379	1,147

Shrinkage. Shrinkage in weight of livestock between the shipping point and the central markets is an element of cost in marketing which is one of the most difficult problems confront the livestock dealer. In buying livestock the dealer must figure on a certain amount of shrinkage and estimate what the shrinkage cost will be. Obviously the market price must be taken into account, that is, a three pound shrink per head on 12 cent hogs would represent a cost of 36 cents while on 8 cent hogs it would be only 24 cents.

It was impossible to get definite figures on shrinkage from livestock dealers due to the fact that they generally do not keep records of home weights and in only a few cases are the account sales available to show market weights. Dealers as a rule think of shrinkage on the basis of per head of livestock and estimates of shrinkage were obtained from 40 dealers in different sections of the State. These figures are only estimates of the average shrinkage per head in average shipments and therefore give only an approximate idea of the amount of shrinkage. These figures are given below in Table 11.

TABLE 11.—Shrinkage Reported by Dealers.

Name of Market Shipped to and Number of Dealers Reporting	Average Shrinkage in Pounds Per Head				
	Cattle	Calves	Hogs	Sheep	Lambs
Cincinnati—8 dealers	43	12	5	8	7
Louisville—25 dealers	40	10	4	7	6
East St. Louis—4 dealers	40	11	5	9	9
Evansville—3 dealers	30	7	4	7	....

Shrinkage varies greatly with different loads and with different kinds and grades of livestock. Average figures therefore only indicate in a general way what the shrinkage is likely to be over a period for any one kind of livestock. The figures given in Table 11 may be a little high because dealers are likely to overemphasize the loss in weight due to shrinkage.

TRANSPORTATION OF LIVESTOCK

Among the services which must be performed in the marketing of livestock is that of transportation. The railroads and truck owners are the important agents performing this service. During the last ten years trucking has been increasing and a considerable volume of livestock is now trucked to central markets but a majority of the livestock is shipped to market on the railroads.

Freight rates. To the shipper of livestock the freight charges appear to be a large item of expense in the marketing of livestock, and while freight charges between the shipping point and the central market may seem high on a car basis, these charges represent only a small per cent of the sale value of the livestock. Figures obtained on cost of marketing 105 cars of cattle in Louisville in 1925 from shipping points over a wide area in Kentucky, indicate that the average freight cost per car was $48.72, which was only 3.1 per cent of the gross sale value of the cattle. A similar report for 51 loads of hogs gave an average of $36.93 per car, which was 1.68 per cent of the sale value, and for 100 decks of lambs, $25.88 per deck or 2.04 per cent of the sale value.

Single deck rates from representative Kentucky points to central livestock markets at Louisville, Cincinnati and Jersey City are given in Tables 12, 13 and 14. Double decks take the same rate as cattle. There is a minimum weight per car (Table 15) established for the different kinds of livestock and if the load is not up to the minimum weight, the shipper will have to pay freight on the minimum number of pounds. The shipper usually does not have any difficulty in loading the minimum in the case of cattle, calves, hogs and fat sheep, but it is practically impossible to load the minimum weight of lambs, that is, 12,000 pounds for a 36 foot car without overcrowding. Where the minimum cannot be loaded the shipper pays a higher charge than the rates indicate. Figures obtained on carlot shipments to Louisville for cattle showed an average of 30 head per car and an average weight of 24,738 pounds. Single deck loads of hogs averaged 84 head weighing 16,909 pounds. Sheep and lambs (practically all lambs) averaged 128 head, weighing 9,120 pounds per deck. Most shipments were in 36 foot cars and the figures therefore indicate that the shipper can load the minimum weight for cattle and hogs but not for lambs.

A large amount of livestock is shipped as mixed loads, that is, loads of two or more kinds of livestock. A high percentage of the calves arriving at Louisville and Cincinnati, come in mixed loads. For mixed shipments the kind of livestock in the car which would produce the highest freight charge, weight considered, determines the rate. For example, the rate on cattle from Lexington to Cincinnati is 18 cents and hogs 20½ cents. A mixed car of hogs and cattle weighing 16,500 pounds would take the cattle rate because cattle figured on the mimimum of 20,000 pounds yield a revenue of $36.00 while a 16,500 pound load of hogs would return only $33.82.

There are special rates for stocker and feeder cattle and sheep shipped to the country, which in general, are 75 per cent of the regular rates.

The usual practice in marketing livestock is to have the stockyards company pay the freight charges and this amount is deducted from the returns from the sale of the livestock.

The weight which determines the charge is therefore the weight at the central market. In Cincinnati the cattle are figured on the basis of weight off the car and hogs the weight when sold less a deduction of 300 pounds per deck for fill. No deduction

TABLE 12.—Freight Rates Per Cwt., Single Deck, on Livestock from Kentucky Points to Louisville—January 1, 1926.

Shipping Point	Cattle	Calves and Hogs	Sheep
Lexington	$0.18	$0.20½	$0.22½
Frankfort	.16	.18½	.20
Shelbyville	.12	.14	.15
La Grange	.11	.12½	.14
Danville	.19	.22	.24
Bardstown	.13	.15	.16½
Elizabethtown	.14	.16	.17½
Lebanon	.16	.18½	.20
Glasgow	.20	.23	.25
Bowling Green	.21	.24	.26½
Hopkinsville	.27	.31	.34
Princeton	.26	.30	.32½
Mayfield	.33	.38½	.42
Owensboro	.21	.24	.26½

Switching charge $1.35 per car on I. C. R. R. and Southern R. R.

TABLE 13.—Freight Rates Per Cwt., Single Deck, on Livestock from Kentucky Points to Cincinnati—January 1, 1926.

Shipping Point	Cattle	Calves and Hogs	Sheep
Lexington	$0.18	$0.20½	$0.22½
Richmond*	.21	.24	.26½
Winchester	.19	.22	.24
Paris	.17	.19½	.21½
Danville*	.21	.24	.26½
Somerset*	.25½	.29½	.32
Flemingsburg*	.25	.29	.31
Harrodsburg	.21	.24	.26
Cynthiana*	.16	.18½	.20
Sparta*	.14	.16	.17½
Lebanon*	.26	.30	.32½
Glasgow*	.29	.33½	.36½
Bowling Green*	.30	.34½	.37½
Campbellsville*	.27½	.31½	.34½

*$3.50 switching charge per car added to rate.

TABLE 14.—Freight Rates Per Cwt., on Single Deck Livestock to Jersey City from Kentucky Points—January 1, 1926.

Shipping Point	Cattle	Calves and Hogs	Sheep
Richmond	$0.64½	$0.72½	$0.79
Cynthiana	.56½	.63½	.69
Lebanon	.68½	.79	.86
Paris	.56½	.63½	.69
Winchester	.56½	.63½	.69
Lexington	.56½	.63½	.69

TABLE 15.—Minimum Weights for Carlot Shipments of Livestock.

Size of Car		Catte	Calves	Hogs	Sheep
Single deck	36'	20,000 lbs.	16,000 lbs.	16,000 lbs.	12,000 lbs.
	36' 7" to 40'	22,272 lbs.	17,000 lbs.	17,882 lbs.	14,000 lbs.
Double deck	36'		22,000 lbs.	22,000 lbs.	18,000 lbs.
	36' 7" to 40'		24,500 lbs.	24,500 lbs.	19,000 lbs.

is made for sheep and lambs and the weight determining freight costs is the weight when sold by the commission firm. In Louisville the weight for sale is used for all classes with deductions of 300 pounds per deck of hogs, 500 pounds for cattle less than 12 hours in transit and 800 when transit time is over 12 hours. For mixed loads deductions of 400 pounds and 550 pounds are made based on time in transit as in the case of cattle. No deductions in weight are made for sheep.

Losses in transit. Records were obtained showing the number of dead and crippled animals which arrived in shipments at the Bourbon Stock Yards in Louisville during 1925.[1] Tables 16 and 17 give the number of dead and crippled animals and indicate what per cent they are of total receipts. The losses due to death and injury in transit are less than one per cent of total receipts but when considered from the standpoint of dollars and cents loss to the shipper they are of great significance. Unfortunately figures were not available to make possible the measur-

[1] Dr. W. S. Smith, Veterinarian for the Southern Weighing and Inspection Bureau at Louisville, furnished these records and other valuable information regarding losses in transit.

ing of these losses in dollars and cents. This discussion must therefore be confined to a consideration of the physical losses from death and injury of livestock in transit.

Dead cattle constituted .07 per cent and crippled cattle .22 per cent of the cattle receipts. Cattle such as old canner cows and thin, starved stockers that are very poor in flesh and in weak condition show the greatest losses due to death and injury in transit. Over a period of 4 years, the number of dead cattle unloaded at the Bourbon Yards was 248, and of this number 127 were canner cows, 64 were cutter cows and thin cattle, 22 were fat cows, 26 were fat and half fat steers and heifers, 9 were bulls of which 6 had been strangled by ropes used to tie them in the car. For the same period of a total of 485 crippled cattle, 242 were canner cows, 71 cutter cows and thin cattle, 63 were fat cows, 92 were fat and half fat steers and heifers and 17 were bulls. Of 124 dead stocker cattle, 100 were in poor thin condition and of 142 crippled stockers 114 were also thin weakened cattle. These figures indicate that thin weak cattle are the greatest sufferers in transit.

TABLE 16.—Number of Dead and Crippled Animals Received in Railroad Shipments at Bourbon Stock Yards, Louisville, in 1925.

	Cattle		Calves		Hogs		Sheep	
	Dead	Crips	Dead	Crips	Dead	Crips	Dead	Crips
January	11	20	10	4	26	68	1	0
February	6	18	11	8	19	49	0	0
March	6	13	11	6	28	52	24	13
April	3	23	3	8	41	16	2	3
May	7	13	6	10	22	30	6	8
June	1	5	10	3	13	25	35	23
July	1	13	5	9	35	23	62	27
August	8	31	23	12	25	24	35	16
September	12	31	9	9	41	24	5	5
October	14	29	8	9	13	17	4	1
November	12	29	13	10	6	25	2	2
December	3	19	10	7	12	43	4	3
Total	84	244	119	95	282	396	180	101

TABLE 17.—Dead and Crippled Animals Received in Railroad Shipments at Bourbon Stock Yards, Louisville, in 1925, Expressed as Per Cent of Monthly R. R. Receipts.

	Cattle		Calves		Hogs		Sheep	
	Dead	Crips	Dead	Crips	Dead	Crips	Dead	Crips
January	.17%	.31%	.37%	.15%	.13%	.34%	.30%	.0%
February	.11	.32	.37	.27	.11	.28	.00	.0
March	.08	.17	.42	.23	.19	.35	3.47	1.88
April	.04	.32	.08	.21	.23	.10	.33	.50
May	.11	.21	.13	.22	.15	.17	.09	.11
June	.02	.08	.15	.05	.10	.18	.06	.04
July	.01	.12	.06	.11	.23	.15	.16	.05
August	.05	.20	.23	.12	.15	.13	.16	.07
September	.08	.22	.14	.14	.26	.15	.13	.13
October	.08	.17	.12	.13	.10	.13	.24	.06
November	.12	.30	.44	.34	.05	.21	.18	.18
December	.04	.28	.36	.25	.09	.33	.25	.18
Year	.07	.22	.20	.16	.15	.22	.12	.07

Dead hogs constituted .15 per cent and crippled hogs .22 per cent of the total hog receipts in Louisville in 1925. It is interesting to note that losses run high in certain single shipments. For the month of July out of a total of 35 dead, 15 were in one car. In August out of 26 dead, 11 were in one car. Similarly for September there were 8 dead in one car and 7 in another out of a total of 41 dead hogs. In these shipments, the losses were reported to have been caused by overheating, resulting from overloading and improper bedding.

According to investigations made by Dr. W. S. Smith, veterinarian for the Southern Weighing and Inspection Bureau at Louisville, death of hogs in transit is caused chiefly by smothering or overheating. In cold weather, unless warmly bedded, hogs will pile up in the car to keep warm and some may be smothered. In hot weather hogs often die of overheating resulting from overexertion while being loaded or by fighting in the car, overcrowding in cars, and from loading hogs in cars with a manure bedding which will "heat up."

At Louisville in 1925 dead calves constituted .2 per cent of the calf receipts, and crippled calves .16 per cent of the receipts. Of the total sheep and lamb receipts .12 per cent were dead and .07 per cent were crippled. Loading calves with cattle and overcrowding is given by Dr. W. S. Smith as the chief cause of death and injury to calves in transit. Small, weak, Number 2 or 3 grade lambs, and thin stock ewes show heavy losses, even when properly loaded, due to exhaustion in shipment. There is a tendency for shippers to overcrowd sheep and lambs by attempting to load the minimum weight.

As a rule there is less danger of having dead or crippled animals in the lighter loaded cars than in the heavy loads. Overloading a car of livestock far above the minimum weight tends to increase losses in transit and does not reduce freight costs. For example, a trader shipped three carloads of hogs to Louisville in which there was enough weight for four minimum cars, and there were 19 dead hogs in this shipment due to overcrowding. The freight charge would have been no higher if they had been shipped in four cars and the loss no doubt would have been reduced. In shipping calves, hogs and sheep, when the shipper has two decks it is economical for him to order a double deck car. Double decks take the cattle rate which is a lower rate and the minimum weight of a double deck is not nearly as large as the minimum for two single decks. Therefore a saving in freight is made by using a double deck instead of two singles.

The motor truck. The motor truck has become an important factor in transportation of livestock to the central market from farms within the territory near the market. At the present time the limit of the trucking area in Kentucky, for both Louisville and Cincinnati, is about fifty miles. Trucks also haul livestock to Evansville, Indiana, from Kentucky points at a distance up to fifty miles. With improvement in roads these trucking areas are expanding.

Table 18 gives figures regarding the amount of livestock trucked to the Cincinnati market for the five years 1921 to 1925. The average amount that arrived by truck during this period was 10 per cent of the cattle, 33 per cent of the calves, 21 per

cent of the hogs and 16 per cent of the sheep and lambs. Table 19 for Louisville receipts indicates that 12 per cent of the cattle, 45 per cent of the calves, 28 per cent of the hogs and sheep arrived by express, boat or truck. Receipts by express and boat are relatively small so that these figures may be considered as giving approximately the livestock which arrived by truck.

A higher percentage of calves are trucked to Louisville and Cincinnati than any other class of livestock. The trucking area corresponds closely to the dairy region which furnishes the milk for these cities and veal calves are a product of dairy farming. Consequently a high percentage of veal calves are produced close to the market. Cattle produced for slaughter on the other hand are raised over a larger territory and only about 10 per cent of the cattle receipts at Louisville and Cincinnati arrive by truck. A fairly large part of the hogs and sheep are produced within the trucking area and are hauled by truck to the market.

TABLE 18.—Receipts by Truck at Cincinnati Market, 1921-1925. Number of Head and Percentage of Total Receipts.

Year	Cattle		Calves		Hogs		Sheep	
	Head	%	Head	%	Head	%	Head	%
1921	22,539	7.8	55,332	33.5	276,023	19.2	64,637	14.7
1922	28,619	10.1	48,220	29.6	288,126	21.4	64,446	16.3
1923	27,115	10.3	60,711	37.1	303,980	21.7	53,678	15.5
1924	28,402	10.6	55,829	32.0	287,906	21.1	55,151	16.8
1925	29,863	11.5	56,522	33.0	239,109	23.0	60,317	16.3
Average	27,307	10.1	55,322	33.0	279,028	21.2	59,645	15.9

Rates for trucking are not definite like the rates for freight on railroads. Rates tend to be established by competition between truck owners at different points. These rates may change from time to time and vary among different truck owners but there is a tendency for rates to be fairly uniform at any one point. Table 20 gives representative rates at points within the

TABLE 19.—Receipts by Express, Boat and Truck (Practically all by Truck) at Louisville Market, 1921-1925. Number of Head and Percentage of Total Receipts.

Year	Cattle		Calves		Hogs		Sheep	
	Head	%	Head	%	Head	%	Head	%
1921	15,128	10.2	45,460	46.8	118,235	30.1	73,429	25.6
1922	18,489	11.0	53,820	47.4	155,678	31.3	73,505	23.1
1923	17,260	11.8	51,051	46.6	168,121	25.2	74,562	28.1
1924	19,032	14.4	44,752	45.3	124,611	26.4	58,278	27.3
1925	18,198	13.3	43,708	42.2	85,074	28.8	85,100	37.1
Average	17,621	12.1	47,758	45.6	130,343	28.3	72,974	28.2

trucking area of the Louisville market. Cattle and hogs are usually hauled on the basis of weight and the calves and sheep on a per head basis, altho there are exceptions to this rule, depending on the bargain which the truck driver makes with the farmer.

Is it more economical for the producer near a central market to ship by truck than by railroad? This raises the whole question of costs of marketing by truck as compared to costs of mar-

TABLE 20.—Representative Rates for Hauling Livestock by Truck from Kentucky Points to Bourbon Stock Yards, Louisville, 1926.

	Approximate Distance Miles	Per Cwt.		Per Head	
		Cattle Cents	Hogs Cents	Calves	Lambs Cents
Shelbyville	30	30	35	$1.00	35
Bloomfield	35	35	40	1.25	40
Bardstown	35	35	35	.....	35
Eminence	40	35	35	1.25	35
Smithfield	40	35	35	1.00	40
Brandenburg	40	....	50	1.30	65
New Castle	45	50	50	1.50	40
Sulphur	45	50	50	1.50	50
Campbellsburg	50	....	50	1.50	50

Table 21.—Truck and Railroad Rates on Hogs to Louisville Per Cwt.

	Truck	Steam Railroads	
		Single Deck	Double Deck
Shelbyville	35c	14c	12c
Bloomfield	40	17½	15
Bardstown	35	15	13
Brandenburg	50	15	13

keting by railroad. Table 21 giving rates on hogs indicates that truck rates are more than twice the railroad rate. If every farmer had a car load of livestock to sell he would usually find it of advantage to ship by railroad to the market. Generally, however, the farmer has only a few head to sell and he finds it of advantage to have a truck call at his farm and haul the livestock to the market.

Truck rates are higher than railroad rates, but the farmer finds it convenient to use the truck because it provides transportation from the farm directly to the market. Marketing by truck also may enable the farmer to take advantage immediately of a rise in prices because he usually can get a report of the market and then decide to sell the same day before the market closes. Within the trucking area the truck has replaced to a large extent the local livestock dealers, and in fact many dealers have gone into the trucking business.

The commercial use of motor trucks has grown very rapidly, but little has been done in regard to public regulation of the trucking business. Most trucks hauling livestock are owned and operated by private individuals and generally speaking, these men are providing excellent service for the producer and take pride in giving good service. However, among the large number of truck operators there are some who are financially irresponsible. Some men have gone into the trucking business with only sufficient capital to make a first payment on a truck, and if the truck is wrecked and the livestock killed or injured, the owner of the cargo might suffer heavy losses and be unable

to make recovery for his loss. This condition needs correction and truckmen should be in a position to assume responsibility for the cargo. Some public regulation which would make it compulsory for the truck owner to carry insurance against cargo losses or to deposit a bond to cover these losses is desirable.

At the present time only a verbal agreement between the truckmen and the shipper is used, and there is need for a uniform system of written contracts. These contracts should show the number of head in the load, name of the shipper and shipping point, the destination and firm to which the load is shipped, the trucking rate and the responsibility of the carrier.

CENTRAL LIVESTOCK MARKETS

There are two central markets that stand out in the foreground as the most important outlets for Kentucky livestock,

TABLE 22.—Railroad Receipts of Kentucky Livestock at Cincinnati in 1926, Showing Origin by Counties.

County	Cars	Cattle	Hogs	Sheep	Calves
Madison	618	14,201	7,834	8,475	4,940
Fayette	554	5,897	10,312	21,112	6,782
Harrison	512	5,097	11,582	23,739	5,423
Mason	444	3,933	12,781	11,598	4,207
Bourbon	421	7,439	5,738	5,702	777
Clark	330	5,358	5,570	7,206	2,773
Boyle	327	5,192	4,744	9,016	4,887
Gallatin	273	2,354	2,714	18,319	2,391
Pulaski	266	3,668	11,964	1,434	3,227
Scott	243	2,483	3,194	16,284	132
Montgomery	236	5,427	2,020	1,579	2,251
Fleming	236	4,353	4,737	1,580	2,175
Grant	225	1,840	652	20,055	462
Nicholas	162	4,298	275	4,307	99
Lincoln	143	2,508	1,590	4,583	1,133
Pendleton	138	1,184	2,817	6,891	2,040
Henry	121	1,718	3,162	2,150	1,461
Warren	111	180	7,383	435	1,705
Mercer	108	1,690	2,975	1,636	66
All others, 50 counties	1,079	16,245	31,583	18,990	7,325
Total	6,547	95,065	133,827	185,091	54,266

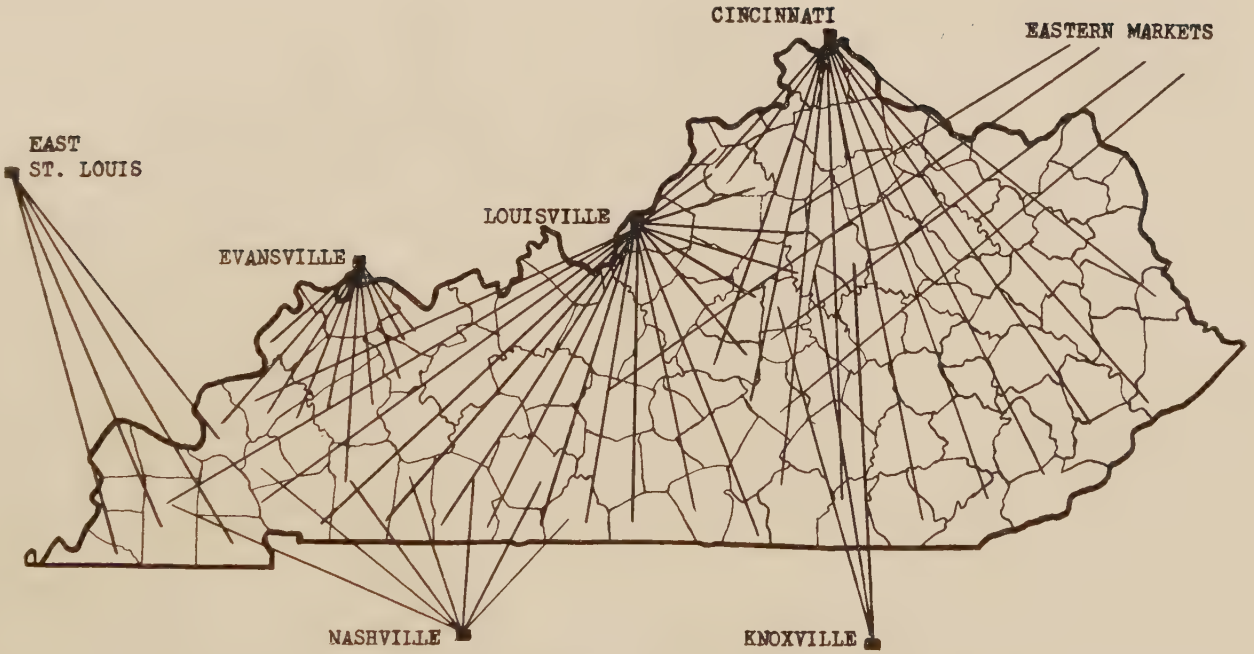

Fig. 6.—Central market outlets for Kentucky livestock, showing approximate territory drawn from.

the Union Stock Yards in Cincinnati, Ohio, and the Bourbon Stock Yards at Louisville, Kentucky. Other markets receiving Kentucky livestock are Evansville, Indiana; East St. Louis, Illinois; Nashville, Tennessee; Knoxville, Tennessee; and eastern markets which include Jersey City, Baltimore, Pittsburg and Cleveland. Figure 6 shows the location of some of these markets and approximately the area in the State from which the livestock is drawn. There is considerable overlapping among these market areas, but in general Cincinnati gets livestock from the Mountains and North Central Kentucky. Table 22 shows the origin of Kentucky receipts at Cincinnati in 1926. Louisville also receives some from the North Central region, but most from the territory to the south and west to the Tennessee River. East St. Louis draws livestock from the Purchase area, Nashville from southern counties bordering Tennessee, Evansville from the Western Coal Field region and Knoxville and eastern markets from North Central Kentucky.

Cincinnati receives more Kentucky livestock than any other market and Louisville is second in importance. Table 23 indicates that the average yearly receipts of Kentucky livestock in Cincinnati for the period 1921 to 1925 was 695,675 head or 32.6

TABLE 23.—Average Yearly Receipts of Livestock at Cincinnati and Louisville. Average of Five Years, 1921-1925.

	Cincinnati			Louisville		
	Total Receipts No. Head	Ky. Origin		Total Receipts No. Head	Ky. Origin	
		No. Head	% of Total		No. Head	% of Total
Cattle	270,880	122,098	45.1	142,003	88,854	62.5
Calves	167,478	65,668	39.2	104,708	64,892	62.0
Hogs	1,317,542	288,773	21.9	454,625	245,499	54.0
Sheep	374,926	219,136	58.4	262,451	184,819	70.4
Total, all livestock	2,130,826	695,675	32.6	963,787	584,064	60.6

TABLE 24.—Average Yearly Receipts (Average of Five Year Periods). Cincinnati Union Stock Yards.

	Cattle	Calves	Hogs	Sheep	Horses and Mules
1874	127,864	.....	743,788	179,039	.....
1875-1879	149,234	2,289	750,786	229,908	693
1880-1884	167,060	15,770	697,954	458,444	6,687
1885-1889	155,214	32,177	650,223	389,488	7,048
1890-1894	174,319	45,889	681,209	432,843	5,048
1900-1904	189,129	45,185	759,415	317,899	11,588
1905-1909	238,449	67,648	958,680	326,549	23,231
1910-1914	254,740	64,617	915,744	401,648	17,843
1915-1919	307,963	92,393	1,363,123	313,601	22,956
1920-1924	276,486	165,269	1,405,131	374,080	6,394
1925	260,245	171,518	1,040,415	369,805	3,039

TABLE 25.—Average Yearly Receipts (Average of Five Year Periods). Bourbon Stock Yards, Louisville.

Year	Cattle	Calves	Hogs	Sheep	Horses and Mules
1877-1879	*53,421	.....	296,898	146,867	8,702
1880-1884	*74,281	.....	257,759	153,253	6.349
1885-1889	*75,489	.....	274,961	116,151	4,494
1890-1894	85,839	8,299	429,144	175,586	2,138
1895-1899	105,672	10,247	760,877	237,365	2,328
1900-1904	98,799	12,046	647,845	243,930	3,971
1905-1909	130,886	31,245	734,716	349,927	5,484
1910-1914	150,745	35,277	612,978	476,526	4,485
1915-1919	162,294	43,374	663,644	290,260	9,722
1920-1924	149,338	102,573	490,724	272,052	3,435
1925	136,842	103,452	295,379	229,493	1,241

*Includes cattle and calves.

TABLE 26.—Relative Receipts at Cincinnati, Louisville and Chicago With Period 1880-84 as 100.

Year	Cincinnati			Louisville			Chicago		
	Cattle	Hogs	Sheep	Cattle	Hogs	Sheep	Cattle	Hogs	Sheep
1880-1884	100	100	100	100	100	100	100	100	100
1885-1889	93	93	85	102	107	76	146	99	223
1890-1894	104	98	94	116	166	116	201	123	419
1895-1899	103	123	95	142	295	155	156	135	593
1900-1904	113	109	69	133	251	159	189	128	704
1905-1909	143	137	71	176	285	228	196	122	749
1910-1914	152	131	88	203	237	305	165	112	940
1915-1919	184	195	68	218	257	189	190	136	706
1920-1924	165	201	82	201	190	178	189	147	695

per cent of the total receipts, the balance being largely from Ohio, Indiana and Illinois. An average of 584,064 head of Kentucky livestock was received per year in Louisville, this being 60.6 per cent of the total, with Indiana and Tennessee furnishing most of the other receipts.

Evansville, Indiana, is a small market, the average yearly receipts for the five years 1921 to 1925 being 210,600 hogs, 39,200 cattle and calves and 8,000 sheep, of which about 15 per cent were of Kentucky origin. The National Stock Yards at East St. Louis ranks as one of the largest livestock markets, with receipts averaging 1,341,000 cattle and calves, 3,985,800 hogs and 574,600 sheep, but receipts from Kentucky are small, being confined largely to shipments from the counties in the extreme western part of the State. Nashville, Tennessee, is one of the leading markets in the South, its average receipts being 103,400 cattle and calves, 400,000 hogs, and 136,000 sheep. Shipments from Kentucky to Nashville consist largely of hogs from southern counties. Knoxville, Tennessee, is of minor importance as a livestock market. Jersey City receives more livestock from Kentucky than any other eastern market. Its receipts in 1924 from Kentucky were 647 cars of lambs and 103 cars of cattle. Jersey City is a large market, its average yearly receipts during the period 1921 to 1925 being 775,600 cattle and calves, 496,400 hogs and 1,513,400 sheep.

Historical development of the Louisville and Cincinnati markets. Table 24 is a summary of the annual reports of the Union Stock Yards Company of Cincinnati since 1874, giving the receipts of livestock at that market. Table 25 is a similar report for the Bourbon Stock Yards at Louisville beginning with the year 1877. Most of the yearly receipts as given in these tables are expressed as average yearly receipts of five year periods. Both markets have had a steady growth in cattle receipts during the period. Calves also show a steady increase in receipts up to 1920 when the receipts increased very rapidly. Cincinnati has grown in importance as a hog market and for the period of 1920 to 1924 the average yearly hog receipts were approximately one and one-half million head. Louisville grew

very rapidly as a hog market in the years 1890 to 1906. The largest hog receipts in the history of this market were for the period 1895 to 1899 when an average of 760,000 hogs were received yearly, a figure which was greater than that for Cincinnati during the same period. Since that time, however, Louisville has declined in importance as a hog market until in 1920-1924 the yearly receipts averaged only one-half million head. Cincinnati is more important than Louisville as a sheep market but it has shown a decline during the above period. Louisville on the other hand showed an increase in sheep receipts up through the period of 1910-1914, when the yearly receipts averaged 467,000 head. Since that time it has declined due to the decrease in the number of sheep on farms and to the increase in direct marketing.

Table 26 shows the receipts of livestock at Louisville, Cincinnati and Chicago as relatives, the period 1880-1884, representing 100. Relatives are used rather than actual receipts because they show the comparative growths more clearly. Louisville was a new market in 1880 while Cincinnati and Chicago were well established. This tends to make the relatives for Louisville somewhat larger than they otherwise would have been.

A comparison of the relative changes in cattle receipts at these three markets over the period 1880 to 1924 shows that Louisville and Cincinnati have had a steady increase while Chicago had a rapid increase in 1890 to 1894, and since then a slow decline. The trend of receipts of hogs at Cincinnati and Chicago has been upward, with the upward movement relatively more pronounced for Cincinnati, while Louisville showed a rapid increase up thru 1899 and since that time a decrease. The significant thing brought out by the comparison on sheep is the remarkable growth of Chicago as a sheep market. The yearly receipts for the period 1910-1914 were nearly ten times as large as for 1880-1884; for Louisville they were three times as great while Cincinnati receipts decreased. In general it can be said that Louisville and Cincinnati have maintained their relative importance as livestock markets in everything except sheep.

OPERATION OF CENTRAL LIVESTOCK MARKETS

Market agencies in the central livestock markets operate under regulation of the United States government. The Packers and Stockyards Act passed by Congress in 1921 gives the Secretary of Agriculture certain regulatory powers over stockyard companies, commission firms and packers. Stockyard companies and commission agencies are prohibited from engaging in unfair trade practices and their rates and charges must be "just, reasonable and nondiscriminatory." Packers also are prohibited from engaging in unfair practices and from restraining competition and manipulating prices.

The stock yards company is a corporation which owns and operates the yards and equipment necessary for handling the livestock. The Bourbon Stock Yards at Louisville cover fifteen acres, representing an investment of over two million dollars, the yards having a capacity of 7,000 cattle, 25,000 sheep and 20,000 hogs. The capacity of the Union Stock Yards at Cincinnati is 8,000 cattle, 20,000 sheep and 20,000 hogs. The function of the stock yards company is to unload, house, feed and care for the livestock. The income of the company is derived from yardage fees and feed charges. Feed charges change from time to time. Yardage charges in 1926 at Louisville and Cincinnati are given in Table 27.

TABLE 27.—Yardage Charges Per Head at Louisville and Cincinnati, 1926.

	Cincinnati		Louisville	
	Off Railroad	Off Road	Off Railroad	Off Road
Cattle	20c	35c	35c	40c
Calves	10	12	16	20
Hogs	8	10	11	13
Sheep and lambs	15	20	9	11

Commission companies are firms which sell the livestock in the central market. For the service of selling they charge a definite fee which is determined by the Livestock Exchange.

These rates at Louisville and Cincinnati are given in Table 28. Cooperative commission associations operate in a number of markets, including Evansville and Cincinnati but not Louisville. These associations charge the regular commission rates and refund part of the net earnings to shippers.

The Livestock Exchange is an organization of commission firms and other livestock agencies in a central market that has for its purpose the furthering of the interests of the livestock industry, establishing rates and enforcing definite trading rules among its members. The Louisville Livestock Exchange is an unincorporated organization, the membership fee being one thousand dollars, and its present membership consisting of fifteen commission firms. The Cincinnati Livestock Exchange is an incorporated organization, the membership fee is two hundred dollars and fourteen Cincinnati commission firms are members.

The buyers of livestock in the central livestock markets include the packer buyers, local butchers, order buyers, shippers and speculators.

Packer buyers buy for packing plants located in the particular market being considered. At Louisville there are seven packing plants and these plants buy a large share of the hogs, cattle and calves sold at the Bourbon Stockyards. The total average weekly killings of all these plants are approximately 1,400 cattle, 400 calves, 4,000 hogs and 300 lambs and sheep. Cincinnati long has been an important packing center and at the present time there are fifteen packing plants operating in that market. These plants buy a considerable share of the livestock sold at the Union Stockyards at Cincinnati.

In each central market there are a number of retail meat markets that obtain much of their meat supply by slaughtering livestock themselves. These firms are called local butchers and in the aggregate are important buyers of livestock, being of special service in furnishing an outlet for small, odd lots of livestock. The number of head slaughtered locally at Cincinnati

TABLE 28.—Commissions for Selling Livestock. In Effect January 1, 1926.

	Carlot Shipments Charge Per Car				Driven in Charges Per Head	Mixed Load
	Single Deck		Double Deck			
	Minimum	Maximum	Minimum	Maximum		
Cincinnati—						
Cattle	$1.00 per head	$25.00	.....	.....	$1.00	
Calves	.50 per head	25.00	.....	$35.00	.50	Same as driven in.
Hogs	15.00	.....	$25.00	.....	1 hog $0.75; 2 to 12 .50; 13 to 60 .40	Maximum for— Single deck $30.00 Double deck $35.00
Sheep	15.00	.....	25.00	.....	1 sheep .75; 2 to 4 1.00; Over 4 .25	
Louisville—						
Cattle	$1.00 per head	$20.00	.....	.....	$1.00	
Calves	.50 per head	20.00	.....	.....	.50	
Hogs	10.00	15.00	$10.00	8c per cwt.	.20	Same as stock driven in. Maximum $25.00 per carload.
Sheep—						
Less than 50 head	.20 per head	.....	.....	.....	.20	
More than 50 head	10.00 per lot	.....	.....	.....	$10.00 per lot	
Over 100 head	.10 per head	.....	.....	.....	.10	

and Louisville, as reported by the Bureau of Agricultural Economics, is given in Table 29. These figures are for the years 1916 to 1925 and include all animals slaughtered by packing plants and local butchers. In 1925 local slaughter in Louisville represented 43 per cent of the total cattle and calf receipts, 79 per cent of the hogs and 10 per cent of sheep and lamb receipts. For Cincinnati local slaughter was 57 per cent, 73 per cent and 14 per cent, respectively, of total cattle, hog and sheep receipts.

During the last ten years Louisville has shown a marked growth in the local slaughter of cattle and calves and hogs. Cincinnati showed very little change during the period in slaughter of cattle and calves, except that there was some expansion during the war years, and in hogs, Cincinnati showed an increase during the period. Local slaughter of sheep and lambs in both markets has fluctuated for different years but showed a marked decline during the last three years.

TABLE 29.—Number of Head Slaughtered Locally at Louisville and Cincinnati, 1916-1925. Thousands (000) Omitted.

Year	Louisville			Cincinnati		
	Cattle and Calves	Hogs	Sheep and Lambs	Cattle and Calves	Hogs	Sheep and Lambs
1916	70	168	25	233	601	79
1917	76	132	20	300	688	51
1918	74	138	24	303	706	52
1919	87	173	24	305	823	84
1920	87	156	29	283	789	81
1921	81	180	26	302	898	121
1922	89	231	27	252	669	91
1923	98	365	24	230	874	62
1924	93	323	18	242	854	60
1925	103	234	22	246	755	53

Order buyers buy on the order of packers in other markets. Shippers buy livestock on their own account for shipment to another market. Speculators buy livestock for speculation, expecting to sell at a higher price in the same market.

FEEDER LIVESTOCK

A questionnaire was sent to a number of cattle feeders for the purpose of obtaining facts regarding the nature of the cattle feeding industry and the market movement of feeder cattle. Seventy-six farmers replied to the questionnaire and the discussion is based largely on the information which they gave.

In answer to questions regarding the source of feeder cattle, 28 answered that they bought cattle in the central market, 23 purchased them locally from farmers and local dealers, 20 from both central markets and local farmers and dealers, and 5 from local dealers in Virginia and Tennessee. Farmers buying in the central market sometimes mentioned that they bought in more than one market, but the Bourbon Stock Yards in Louisville stands out as the most important source of feeder cattle. The Louisville market was mentioned by 31 farmers, Kansas City by 11, East St. Louis by 8, Chicago by 3, and Cincinnati and Fort Worth each mentioned once. Louisville supplies over fifty per cent of the feeder cattle shipped from central markets to feeders in Kentucky. This is shown by Table 30 which gives the market origin of stocker and feeder cattle shipped into Kentucky, based on the reports of the livestock inspected for shipment by the Bureau of Animal Industry of the United States Department of Agriculture. While Louisville is by far the most important, the other markets mentioned above also ship several cars of feeder cattle into Kentucky every year.

Feeders buy the cattle thru commission firms when purchases are made in the central market and all the feeders reporting that they bought cattle in the central markets stated that their purchases were in car load lots. When feeder cattle are bought from farmers and dealers in the local market, purchases as a rule consist of only a few head at one time. Sometimes feeders arrange with local dealers to buy a load of cattle for them, indicating the kind and quality of cattle they want and the price they are willing to pay.

The usual time for purchasing feeder cattle is in the fall. Sixty-three feeders mentioned months included in the period July thru December, with September, October and November the most important. Four feeders bought in the fall and also in the spring and three stated that they purchased cattle any time during the year when the market was favorable.

The type of cattle purchased varies with different feeders. In reply to the question regarding the kind of feeder cattle purchased, 33 answered that they bought long yearling or 2 year old steers weighing from 700 to 1,000 pounds with quality ranging from fair to choice. Fifteen feeders stated they bought 2 or 3 year old cattle weighing 900 to 1,100 pounds. Where breed was mentioned Hereford and Angus predominated. Other types indicated by feeders were yearling heifers, good plain cattle, both cows and common steers 700 to 900 pounds.

The time of sale for fat cattle depends upon the feeding methods followed. In general there are two methods, a short period of feeding and a long period of feeding. Under the first method cattle are purchased in the fall, first run on grass and then fattened in the feed lot for sale during March or April as a rule. This method is followed in nearly all sections of Kentucky except the bluegrass area, where the longer feeding period is generally employed. In this area feeder cattle are purchased in the fall, carried thru the winter with a small gain in weight and then fattened on pasture to be sold during the summer or early fall.

In selling fat cattle the practice of many feeders is to ship in carload lots and sell in the central markets, but a number sell to local livestock dealers or representatives of the packers. Of the feeders answering the questionnaire, 23 stated that they sold in the central market, 18 to local dealers, 11 to packer buyers, and 23 to both central markets and local buyers, depending upon offers received. Twenty-four mentioned the Louisville market,

19 the Cincinnati market, 6 Jersey City, 4 Pittsburg, 3 Indianapolis, 2 Buffalo, 2 Chicago, and 1 Philadelphia.

Practically all cattle feeders sell the fat cattle in carload lots. Sixty-four feeders answered that they sold in car lots, 3 sold in smaller lots to local buyers, and 3 trucked cattle to the market. Since the feeders have sufficient livestock to ship in carlots, they are in a position where they are not dependent upon local livestock buyers for an outlet, but can ship direct to the central market.

Besides cattle feeders, there are some farmers that buy feeder hogs, lambs and sheep on the market to feed and later sell as fat stock. The number of hogs shipped to the country is rather small but for sheep and lambs the number is nearly as great as cattle. As with cattle, Louisville is the important source of stocker and feeder hogs and sheep. Tables 31 and 32 indicate the market origin of stocker and feeder hogs and sheep inspected for shipment into Kentucky by the Bureau of Animal Industry.

TABLE 30.—Market Origin of Stocker and Feeder Cattle Shipped Into Kentucky.

Name of Market	Number of Head Shipped Yearly						
	1920	1921	1922	1923	1924	1925	1926
Chattanooga		197	401	563	272	1,650	660
Chicago	3,768	7,318	1,964	1,335	776	1,265	2,512
Cincinnati	7,330	6,219	3,282	3,123	1,543	4,462	4,837
Kansas City	2,010	2,123	2,066	4,661	2,887	4,903	7,004
Louisville	21,589	29,637	36,130	27,610	13,756	22,532	18,642
Nashville	1,195	1,745	3,191	2,428	1,417	2,485	2,803
East St. Louis	7,639	6,297	6,834	3,819	2,006	3,126	3,291
Other markets	2,932	1,165	2,530	5,383	1,122	3,751	9,258
Yearly total	43,824	54,701	54,121	48,922	23,779	44,174	49,007

TABLE 31.—Market Origin of Stocker and Feeder Hogs Shipped Into Kentucky.

Name of Market	Number of Head Shipped Yearly						
	1920	1921	1922	1923	1924	1925	1926
Montgomery	.....	1,687	564	.....	.....	2,352	7,029
Cincinnati	192	1,309	414	585	169	591	254
Louisville	5,316	7,079	2,737	1,087	1,282	870	2,076
Nashville	249	446	155	120	.....	215	.....
Other markets	.....	2,228	720	483	.....	1,821	1,522
Yearly total	5,757	11,062	4,026	2,275	1,451	5,849	10,881

TABLE 32.—Market Origin of Stocker and Feeder Sheep Shipped Into Kentucky.

Name of Market	Number of Head Shipped Yearly						
	1920	1921	1922	1923	1924	1925	1926
Chicago	7,689	5,476	9,943	3,844	2,120	3,173	2,978
Cincinnati	4,726	1,642	9	.....	10	10,049	13,969
Louisville	15,774	23,240	41,397	31,500	16,114	25,049	55,290
East St. Louis	1,543	1,214	3,580	2,057	4,269	2,871	2,234
Other markets	2,019	534	822	1,407	2,160	2,467	4,002
Yearly total	31,751	32,106	55,751	38,808	22,729	43,609	78,473

COST OF MARKETING

Local livestock dealers usually buy livestock on the basis of prices in a central market less a margin sufficient to cover all costs and allow them some profit. The central markets, on which prices are based, are mainly Cincinnati, Louisville, Evansville and East St. Louis, depending upon the section of the State where the dealer is located. Reports were obtained from 47 livestock dealers regarding margins on which they figured. Of these reports, those of 25 dealers in the Louisville territory are most

significant because the number reporting for other markets is relatively few. For the Louisville territory the average estimated margin reported by dealers in 1926 was 72 cents for cattle, 81 cents for hogs, $1.65 for calves, $1.70 for sheep, and $2.12 for lambs. These figures are averages for a number of points and, therefore, do not represent margins at any one point. There was a range in margins reported by dealers in this territory from 50 cents to $1 for cattle, 60 cents to $1 for hogs, 75 cents to $2 for calves, $1 to $2.50 for sheep, and $1.50 to $3 for lambs.

Marketing costs for livestock may be classified under three main headings, local market, transportation, and central market costs. In order to obtain some information on central market costs and transportation charges, figures were obtained from shipments of livestock from a number of Kentucky points sold in the Louisville market in 1925. This study represented 105 cars of cattle, 51 cars of hogs, 100 decks of lambs, and the figures obtained are summarized in tables 33, 34 and 35.

Central market costs. There are three principal items of expense in the central market, yardage, commission and feed costs. In addition, there are small charges for insurance and miscellaneous.

The commission rates for selling livestock at Louisville have been mentioned in the discussion of central markets. For the carloads of cattle studied, commission charges averaged $19.95 per car, or 8 cents per cwt., and represented 1.3% of the gross sale value of the cattle. The commission on hogs averaged $12.75 per car, or 8 cents per cwt., and .6% of the sale value. The commission on lambs averaged $12.63 per deck, or 14 cents per cwt., and 1% of the sale value.

Yardage for cattle averaged $10.30 per car, or 4 cents per cwt., and .7% of the sale value. For hogs it averaged $9.07 per

car, 5 cents per cwt., and .4% of the sale value. Yardage for lambs averaged $11.55 per deck, 13 cents per cwt., and represented .9% of the gross sale value.

TABLE 33.—Central Market and Transportation Charges in Marketing Cattle. Report of 105 Cars from Kentucky Points Sold at Louisville Market in 1925. 3,163 Head, Weight 2,597,530 Lbs. Gross Sale $164,067.52.

	Total Cost 105 Cars	Percentage Distribution	Cost Per Car	Cost Per Cwt.	Per Cent of Gross Sale
Freight charges	$5,155.68	49.0%	$48.72	$0.197	3.11%
Yardage	1,082.12	10.4	10.30	.042	.66
Feed cost—Hay	1,880.45	18.0	17.90	.072	1.15
Corn	244.15	2.3	2.32	.009	.14
Insurance	15.75	.2	.15	.001	.01
Miscellaneous	10.50	.1	.10	.001	.01
Commission	2,095.00	20.0	19.95	.081	1.28
Total	$10,443.65	100.0	$99.46	$0.403	6.36

TABLE 34.—Central Market and Transportation Charges in Marketing Hogs. Report of 51 Cars from Kentucky Points Sold at Louisville Market in 1925. 4,274 Head, weight 862,371 Lbs. Gross Sale $112,017.89.

	Total Cost 51 Cars	Percentage Distribution	Cost Per Car	Cost Per Cwt.	Per Cent of Gross Sale
Freight charges	$1,883.59	48.8%	$36.93	$0.218	1.68%
Yardage	462.85	12.0	9.07	.054	.41
Feed cost—Corn	838.25	21.7	16.43	.097	.75
Insurance	7.65	.2	.15	.001	.006
Miscellaneous	5.10	.1	.10	.001	.004
Commission	660.55	17.2	12.95	.077	.59
Total	$3,857.99	100.0	$75.63	$0.448	3.44

TABLE 35.—Central Market and Transportation Charges in Marketing Lambs. Report of 100 Decks (76 Single—12 Double) from Kentucky Points Sold at Louisville Market in 1925. 12,835 Head, weight 912,090 Lbs. Gross Sale $126,537.12.

	Total Cost 100 Decks	Percentage Distribution	Cost Per Deck	Cost Per Cwt.	Per Cent of Gross Sale
Freight charges	$2,587.65	49.2%	$25.88	$0.284	2.04%
Yardage	1,155.15	22.0	11.55	.126	.91
Feed cost—Hay	228.90	4.3	2.29	.025	.18
Insurance	15.00	.3	.15	.002	.01
Miscellaneous	8.20	.2	.08	.001	.01
Commission	1,263.20	24.0	12.63	.138	1.00
Total	$5,258.10	100.0	$52.58	$0.576	4.15

The feed charges are changed occasionally by the stockyards company, but during most of the year 1925 corn was $1.75 per bushel and timothy hay $1.75 per hundred pounds. The average amount fed per carload of cattle was 1000 pounds of hay and 1.3 bushels of corn, for hogs 9.2 bushels of corn, and for lambs 133 pounds of hay. Feed costs for cattle averaged $20.22 per car, 8 cents per cwt., and 1.3% of gross sale value. For hogs feed costs averaged $16.43 per car, 10 cents per cwt., and represented .8% of the gross sale. Feed costs for lambs were lower and averaged only $2.29 per deck, 2½ cents per cwt., and .2% of the sale value.

In addition to the above charges a fee of 15 cents per car is collected to cover insurance and 10 cents as a contribution of the shipper to the Southeastern Livestock Association. This last charge is refunded upon request of the shipper.

Transportation costs. From the study made of carloads of livestock sold at Louisville, in the case of cattle, freight charges averaged $48.72 per car, 20 cents per cwt., and 3% of the sale value. For hogs, freight charges averaged $36.93 per car, 22 cents per cwt., and 1.7% of gross sale value; and for freight charges on lambs, $25.88 per deck, 28 cents per cwt., and 2% of the sale value.

Shrinkage in weight and losses in transit due to crippled and dead animals, result in costs which are an important part of the total cost of marketing, but these costs vary and are not definite like yardage, commission and freight charges. If changes can be brought about which will reduce the losses from shrinkage, dead

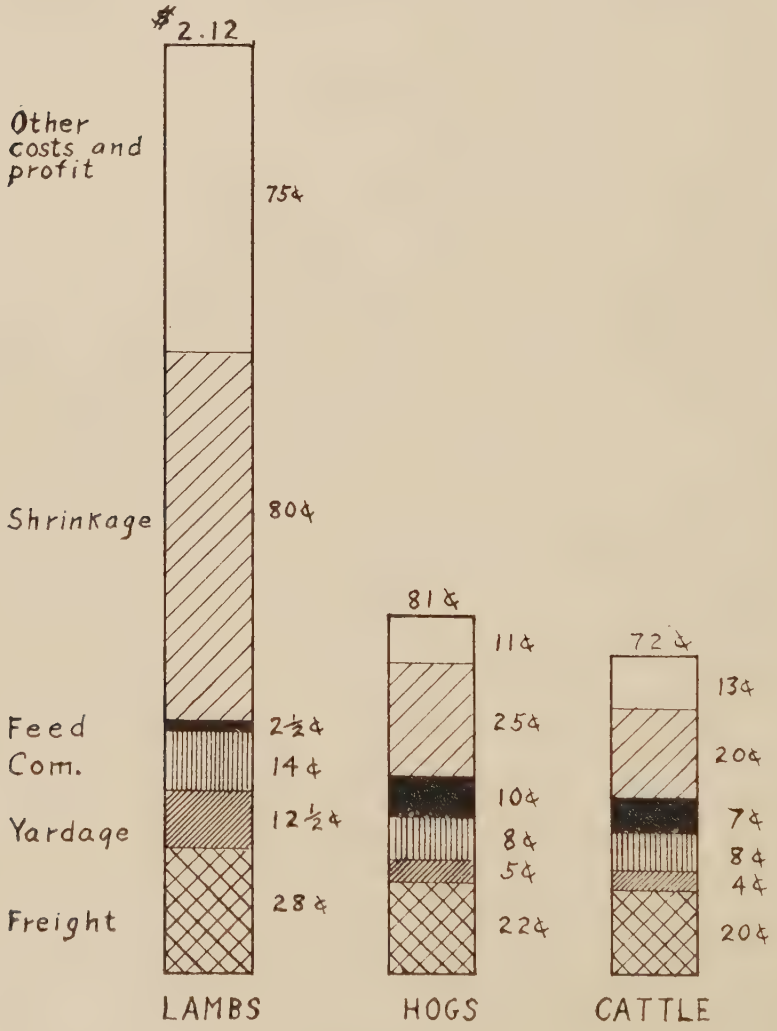

Fig. 7.—Average estimated margins per cwt. for local livestock dealers.

and crippled animals, the total cost of marketing will be lowered materially.

Local costs. Because of lack of records on the part of livestock dealers, no attempt was made to analyze local costs. These costs include such items as automobile expense, telephone, market news, office rent, yard and scale expense, interest on capital, buyer's time, etc. They vary greatly between different dealers, some dealers being able to operate more efficiently than others.

Spread between local and central markets. Figure 7 shows graphically the estimated spread between prices in the local and central market for cattle, hogs and lambs, and the importance of the various items that make up this spread or margin. These margins are based on the average estimated margins as reported by twenty-five livestock dealers in the Louisville territory, and on the figures obtained from account sales of cars from that territory. They are the average of estimates and do not represent costs for any one point, but serve the purpose of giving a picture of the relative importance of various costs that make up the margins. The relative importance of various costs is also given in Table 36.

TABLE 36.—Estimated Average Margins Per Cwt. Charged by 25 Livestock Dealers in Louisville Territory.

	Lambs		Hogs		Cattle	
	Dollars	% of Total	Dollars	% of Total	Dollars	% of Total
Freight	$0.28	13	$0.22	27	$0.20	28
Yardage	.12½	6	.05	6	.04	5
Commission	.14	7	.08	10	.08	11
Feed	.02½	1	.10	12	.07	10
Shrinkage	.80	38	.25	31	.20	28
Other costs including dealer's profit	.75	35	.11	14	.13	18
Total	$2.12	100%	$0.81	100%	$0.72	100%

Margins on lambs are by far the largest, being nearly three times as great as those for hogs and cattle. This was due not only to a somewhat higher freight and terminal market cost, but also to the high shrinkage and other costs.

The question might logically be asked, What are the chances for reducing the margin between local and central market prices? To answer this the various items of cost must be considered.

Shrinkage stands out as being the largest item of cost in the margins between local and central market prices. Shrinkage is estimated from reports of dealers to constitute 35% of the margin on lambs, 31% on hogs and 28% on cattle. This item of cost can be lowered considerably if farmers will deliver livestock with less fill, and the livestock dealer in turn will be able to give the farmers the benefit by reducing margins.

Freight charges are determined by rates, and the trend of freight rates can not be predicted with certainty. Loading the minimum weight and using double decks for hogs will have a tendency to reduce the margin due to freight charges.

Local costs vary with different dealers but the uniformity of margins among dealers at any one point seems to indicate that they are often high enough to keep the least efficient dealer at that point in business. The auction sales have had a tendency to reduce the local costs, and at some points, cooperative shipping associations could undoubtedly handle livestock at lower costs than private dealers are doing.

Central market costs are determined by rates charged by the agencies in the market, the Secretary of Agriculture having the power to see that the rates are "just, reasonable and nondiscriminatory." Commissions make up 7 per cent of the margin on lambs, 10 per cent for hogs and 11 per cent for cattle. Whether or not this cost could be reduced is difficult to say. On most central markets there are a large number of commission firms and undoubtedly rates are high enough to maintain some small inefficient firms. Fewer organizations with a larger volume of business ordinarily should be able to perform the selling service at lower rates because of greater efficiency. This has been demonstrated by the cooperative commission companies on some markets which

have been able to make very material refunds on the commissions charged. Yardage is of less importance, constituting only 6 per cent of the margin for lambs and hogs and 5 per cent for cattle. Unless there is a material increase in receipts it is not likely that stockyards companies will be in a position which will enable them to reduce materially yardage charges. Feed costs are of small significance in the case of lambs, being only one per cent of the margin, but for hogs and cattle they make up 12 and 10 per cent respectively of the margin. Packers are interested in dressing percentage and they take into consideration the fill of animals in buying, and make price offers accordingly. Therefore, expensive filling at the central market not only increases the spread between the local and central market, but actually lowers the price per pound paid for livestock. While some feeding is usually necessary, heavy filling represents an unnecessary waste in the marketing of livestock.

There is room for improvement in the methods of marketing livestock through effecting a more direct routing to market. Central markets serve to concentrate livestock for sale to packers and other buyers. Some of the livestock received at central markets is reconsigned to other markets and while a certain amount of reconsignment is necessary to keep markets in line, a part of it is due to improper distribution between markets. Better distribution of shipments among markets in the first place would reduce the amount of reshipment necessary and would eliminate some of the expense involved. More extensive use by shippers of market information showing conditions in different markets would aid in accomplishing this result.

The movement of livestock to market is seasonal as has been shown above. This is due to the characteristics of livestock production and cannot be eliminated. However, there are wide fluctuations in receipts on the markets aside from the seasonal variations. Marketing agencies must have sufficient equipment and labor to handle all the livestock during the days of heavy receipts, and when receipts are light, a part of these facilities remain idle. A more uniform distribution of shipments during the seasonal movement would permit more efficient use of labor

and equipment, which would lead to more economical marketing of livestock.

GRADING OF LIVESTOCK

Livestock differs greatly as to kind, condition and quality and is, therefore, difficult to classify and grade. The result is that practically all livestock is sold not by description or grade, but by inspection, that is, by the buyer examining the livestock before purchasing. Custom, however, has established certain grades which are employed in the central and local markets in describing livestock.

One of the outstanding weaknesses of the local livestock market is the lack of attention to grades. Producers generally do not understand the variations in quality and condition of animals and their relation to price, and consequently much livestock is sold without a realization of the true market value. While many local livestock dealers are shrewd judges of market values of livestock, there are also a large number of dealers that do not fully understand market grades and the relation of grades to prices. This means that much livestock is sold by producers at prices that do not properly reflect the differences in quality and condition. In buying livestock at country points the usual practice is for the dealer to make one price on a farmer's lot of hogs, sheep and even cattle, altho in that lot there may be a wide variation in grade. The result of such a practice is that the farmer does not have the opportunity to learn the market values of his livestock and often fails to realize that the high grade livestock sells for higher prices than the low grade. Consequently such a system of buying at country points provides but very little incentive for the farmer to improve the breeding and feeding of his livestock.

The local auction sales organizations of central Kentucky have been a real step in progress, because they grade the sheep, hogs and calves and sell in lots according to grade. The farmer has therefore come to realize that the better livestock sells for higher prices and has taken steps to improve the livestock in order to get a greater return.

In the central livestock market the commission man sorts each consignment of livestock into lots which he figures will enable him to sell to the best advantage. The livestock is not sold directly on the basis of grade as the buyers examine each lot and form their own judgment in regard to the condition and quality of the animals. However, there is a wide range in prices which livestock bring, due to differences in conformation, condition and quality, and custom in the market has established certain grades which, while not official, are a basis for describing these differences. These grades are therefore a means for the buyer to indicate what kind of animals he wants and for the seller to explain what he has for sale.

One of the most important services of a system of grades is in reporting market prices. In order to quote market prices it is necessary to have some means of describing the animals and a system of grades is absolutely essential. There is also need for standardization of grades among the various central markets. At present every market has its own standards and while the terms used may be similar they do not mean the same in all markets. This has led to much confusion, and shippers have frequently interpreted the market conditions wrongly, the reports seemingly indicating that one market was higher than another, while as a matter of fact it was lower. A standard system of grades would result in more accurate market reports which would be of greater value to the producer and shipper, especially in helping him decide where to sell the livestock. The Bureau of Agricultural Economics of the United States Department of Agriculture is making an effort to standardize livestock grades and has drawn up a system of grades which it is recommending. A complete discussion of these grades will be found in Department Bulletin, Number 1360, U. S. Department of Agriculture, entitled "Market Classes and Grades of Livestock."

Market information and prices. Market information is of vital importance to the livestock dealer and to the livestock producer. The livestock dealer must know prevailing market prices to enable him to buy intelligently, and the producer must

understand the condition of the market if he is to decide intelligently when to sell, and know approximately the price at which the livestock should sell.

As a rule livestock dealers keep well posted on market conditions. Of dealers interviewed, the majority stated that they received market information from the nearest central market either by the telegraph service or by telephone calls from com-

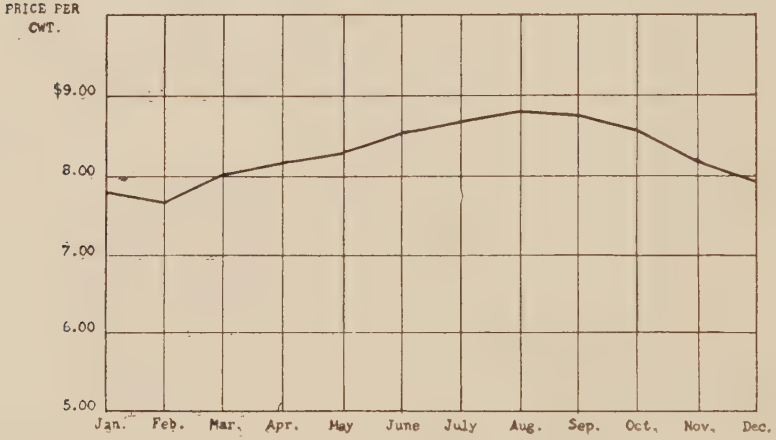

Fig. 8.—Average monthly prices for native beef steers, at Chicago, for 25 years, 1901–1925.

mission men. In addition they also secured information from daily papers, market journals, and reports sent out by commission men. Producers generally get reports of the livestock market from daily papers, from journals and from the local livestock dealer, it being a common practice for the farmer to call up the livestock dealer by telephone and find out what the market is. The farmer who keeps posted on the market and knows market values is in a better bargaining position in selling to the local livestock dealer than the farmer who has little or no information about the market.

In addition to the private market reporting system, the government market reporting service is established in several of the larger livestock markets and provides complete and reliable

daily market reports giving information on receipts and prices. This service has not been extended to Louisville but just recently a government market news bureau was established at the Union Stock Yards in Cincinnati. Besides the market news, the government also publishes estimates regarding livestock on farms and the general condition of the livestock industry.

The central livestock markets are the important agencies for registering livestock prices. These markets are in communi-

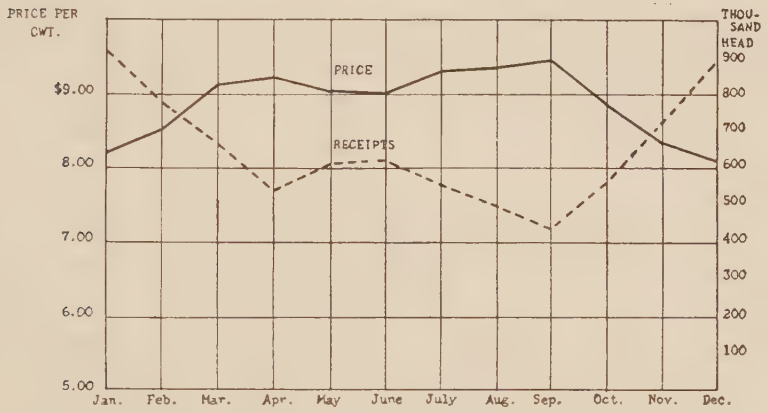

Fig. 9.—Average monthly prices of hogs and monthly hog receipts at Chicago for twenty-five years, 1901-1925.

cation with each other, so that the prices in one market tend to stay in line with prices in the other markets, and the prices paid by local dealers in turn are based on the central markets.

Livestock prices are subject to fluctuations which may be classified as daily, seasonal and cyclical.

There are frequently wide fluctuations from day to day in the market prices of livestock. At times these fluctuations are only a few cents but occasionally may be over one dollar per hundred pounds and to the shipper of livestock these fluctuations are of vital concern. The livestock dealer who ships regularly may find that losses due to a sudden drop in the market are over a period, offset by gains from rises in prices, but the producer who ships one car of hogs or cattle a year may suffer a heavy

loss because of a sudden break in prices when his load reaches the market. The elimination of extreme daily fluctuations in prices is generally recognized as being highly desirable, but any program which proposes a remedy to the situation, must involve a careful analysis of factors causing price fluctuations. On the demand side of the market there are many influences which change from time to time and result in changes in price. The supply of livestock is also a factor, receipts of livestock being irregular and often varying greatly from one day to the other.

Seasonal fluctuations in prices occur rather regularly at different periods of the year. Figure 9 shows the average monthly prices of hogs at Chicago for the twenty-five-year period 1901 to 1925. There is a tendency for hog prices to move in two cycles during the year, reaching a high peak in April, then falling slightly during May and June, rising again during July and August to reach the highest price of the year in September. The average prices for the twenty-five year period were lowest in the month of December, with November, January and February also months of low prices.

Volume of receipts is an important factor causing seasonal fluctuations in prices of livestock. Figure 9 also shows the average monthly receipts of hogs at Chicago for the twenty-five year period and indicates that on the average when receipts are large, prices are low and when receipts are small, prices are high.

Figure 8 shows the average monthly prices of native steers at Chicago, for the twenty-five year period 1901 to 1925. The highest average prices of native steers are reached in the months of June, July, August and September, with a peak for the year in the month of August. The lowest prices are for the months of December, January and February. It was impossible to get figures on receipts of native steers at Chicago for this period as native steer receipts are included with other classes and only figures on total cattle receipts are available.

In addition to daily and seasonal fluctuations in livestock prices there are the changes which occur over a period of several

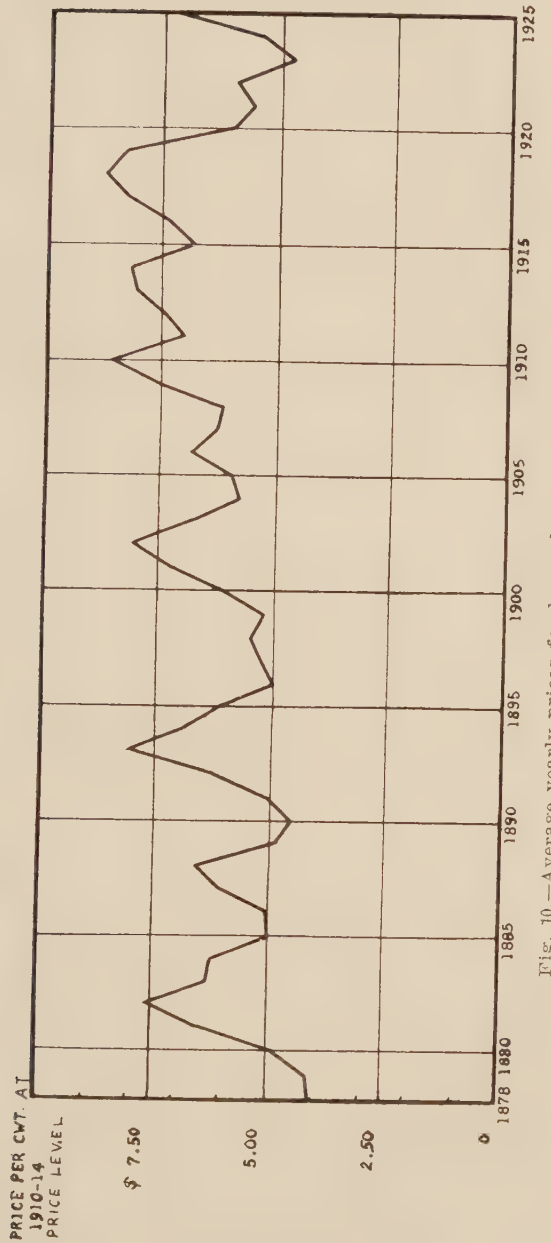

Fig. 10.—Average yearly prices for heavy hogs at Chicago, 1878 to 1925, reduced to 1910-1914 price level.

years, these changes showing a tendency to occur in fairly regular cycles and therefore referred to as cyclical fluctuations.

The cycle of hog prices is indicated in Figure 10 which shows the average yearly price of heavy hogs at Chicago for the years 1878 to 1925, these prices having been corrected for changes in the general price level, and brought to a 1910-1914 level of prices. This was done by dividing each yearly average hog price by the index number of prices of all commodities for the corresponding year. By so doing, the fluctuations due to changes in the price level are largely eliminated and the price fluctuations as indicated in the chart are the result of other factors. It is noticeable in Figure 15 that hog prices move in cycles, the prices rising for about two or three years and then falling for about an equal period, completing a cycle in approximately five years. The main reason for this cycle in hog prices is that when prices are high and hog raising profitable the farmers increase production and the increased supply of hogs causes a fall in price. When prices fall producers tend to curtail production, which reduces the supply of hogs and prices rise again. The result is that hog prices tend to move in cycles.

Beef cattle prices also move in cycles but the cycles are of longer duration than for hogs. Figure 11 shows the average yearly prices of heavy steers in Chicago reduced to a 1910-1914 price level. According to this chart, prices of heavy steers tend to rise for a period of about nine years and fall for periods of five to seven years, making a complete cycle in approximately fifteen years. Figure 11 begins with the year 1878, but prices began to raise in 1875 and reached a peak in 1884, a period of nine years. Prices then fell for five years, reaching a low in 1889, then began to rise and continued upward for 10 years, reaching a peak in 1899. Prices declined following 1899, but what might be assumed as an abnormal situation developed in 1902 when prices of heavy steers rose rapidly during the spring and summer, bringing the average price for the year to a high figure. Prices fell rapidly during November and December, 1902, and remained on a low level during 1903 and 1904. Prices then rose over a period of ten years to 1914. Actual prices for

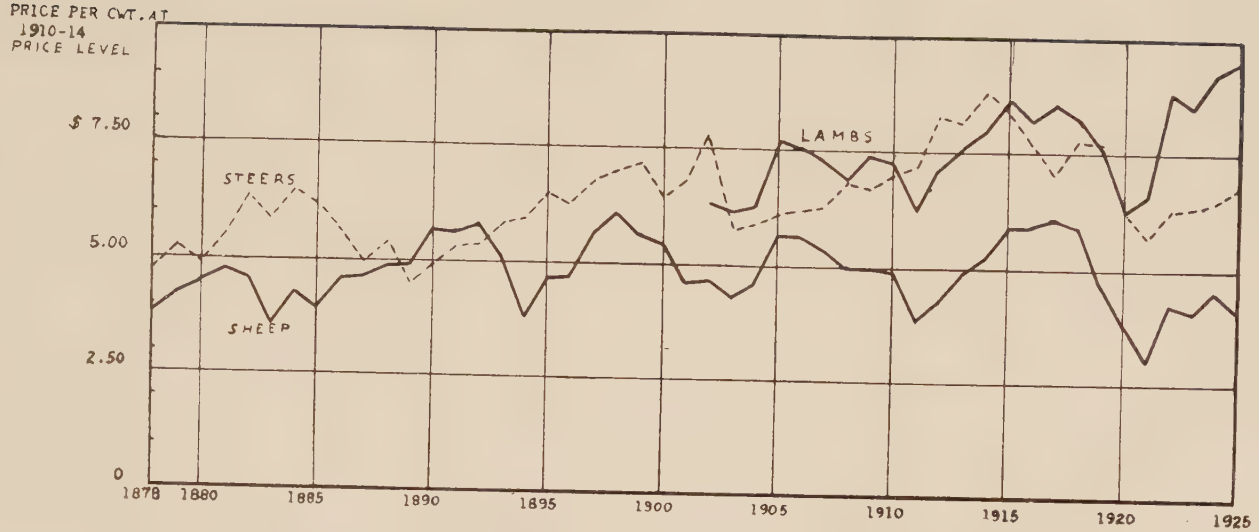

Fig. 11.—Average yearly prices for aged native sheep and 1,200 to 1,500 pound steers, at Chicago, 1878 to 1925, and lambs, 1902 to 1925, reduced to 1910-1914 price level.

beef continued to rise until 1919 in line with the increase in the general price level but did not increase as rapidly as other commodities. The result is that the prices in Figure 11 which are corrected for the changes in price level show a decline from 1914 to 1921. The cycle of beef prices as with hog prices is the direct result of cycles of overproduction and underproduction of beef cattle.

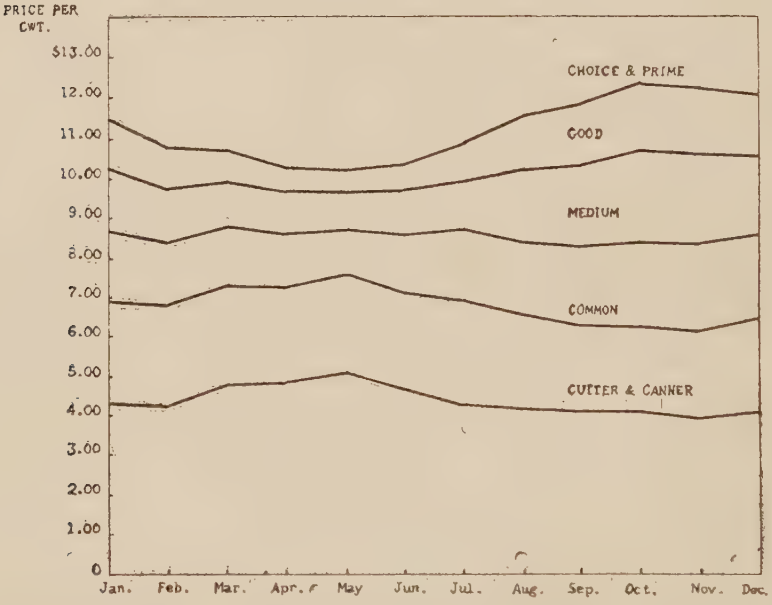

Fig. 12.—Average monthly prices for different grades of light-weight steers at Chicago. Average of five years 1921 to 1925.

Cyclical fluctuations also occur in sheep prices. Figure 11 also gives the average yearly prices of aged native sheep from 1878 to 1925 and lamb prices for the years 1902 to 1925. These prices as shown are reduced to a 1910-1914 price level. Sheep and lamb prices complete a cycle on the average in eight to nine years, prices rising about four or five years and falling for approximately the same number of years.

Grade is an important factor in livestock prices. Livestock vary greatly in grade, and prices vary accordingly, the higher

grades selling for higher prices than the lower grades. The price differentials between grades, however, are not constant but change from time to time with changes in market conditions. This point is illustrated in Figure 12 which gives the average monthly prices of different grades of light steers at Chicago for the five years 1921 to 1925. The spread in price between grades for this period was narrowest in May and widest in October, the difference in price of prime and choice steers and of common steers being $2.75 in May and $6.10 in October. The average yearly price for 1921-1925 was $11.25 per hundred pounds for choice and prime steers, $10.09 for good, $8.55 for medium, $6.81 for common and $4.39 for cutters and canners, showing a very marked difference in price due to grade. Sheep also show wide differences in price due to grade. Medium to prime lambs (84 pounds down) sold at Chicago during the years 1921 to 1925, averaged $13.07 per hundred pounds while common and cull lambs averaged only $10.31. Hogs do not vary as greatly in grade as cattle and sheep and the price differentials are not as large. Weight is a factor of importance in the price of fat hogs and during the years 1921 to 1925 as an average, the medium and light weight hogs sold for higher prices than heavy hogs. At Chicago during this period, heavy hogs (over 250 pounds) averaged $9.23, medium hogs (201-250 pounds) $9.39 and light hogs (151-200 pounds) $9.32.

SUMMARY

1. Livestock production in Kentucky, with the exception of hogs, has increased in importance during the last seventy-five years.

2. The heaviest marketing of Kentucky cattle occurs in the fall, calves and lambs in the summer, and hogs in the fall and spring.

3. Buying by grade is an incentive for producers to improve the quality of livestock, and failure on the part of many buyers to pay according to grade is one of the greatest weaknesses of the local livestock market.

4. Heavy shrinkage between the local and central markets is a factor making it necessary for the livestock dealers to buy on greater margins.

5. Losses in transit can be materially reduced by proper loading and handling. Transportation costs can be reduced by using double decks and loading not less than the minimum weight whenever possible.

6. Cincinnati and Louisville are the most important outlets for Kentucky livestock. Other markets of importance are Evansville, East St. Louis, Nashville and Jersey City. Louisville is also the principal source of feeder cattle and sheep.

7. Average margins charged by livestock dealers in the Louisville territory, based on estimates made by dealers in 1926, were $2.12 per hundred pounds for lambs, 81 cents for hogs and 72 cents for cattle.

8. Irregularity of receipts at central markets is a weakness of the marketing system. More orderly distribution between markets and greater uniformity in time of marketing are needed to improve the livestock marketing system.

Kentucky

Agricultural Experiment Station

University of Kentucky

COMMERCIAL FEEDING STUFFS IN KENTUCKY IN 1926

BULLETIN NO. 279

Lexington, Ky.

April, 1927

(103)

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BULLETIN NO. 279

Commercial Feeding Stuffs in Kentucky in 1926

By J. D. TURNER, H. D. SPEARS, W. G. TERRELL and W. A. ANDERSON, JR.

The attitude of the manufacturer of commercial feeds in the present day is entirely different from what it used to be. Only a few years ago, there was real indifference on the part of the manufacturer in the matter of complaints either by officials for irregularities in making and selling feeding stuffs, or by feeders on account of inferior quality. But the manufacturer has paid for these sins in state regulations, ill-will, hostility. Today a better understanding exists. He is better organized. He is organized for service. He is anxious to please his customer. He has learned that a dissatisfied customer, formerly a nuisance, may be turned into an asset. He knows when he pleases his customer, the customer will tell it to others. The manufacturer is organized not only to give better service, but to create good will, as evidenced by extensive methods of education and by the use of the open formula.

The increased interest taken by the feeder is another indication of changed conditions and is very gratifying. He is studying his feed problems as never before, both from a practical and a scientific standpoint, by reading, by experimenting and by consulting the Kentucky Experiment Station and other sources of information. He is turning to his own resources thru better knowledge of feeds and their use, and thru discriminate

buying. He is learning that it is more economical to raise as much of his feed material as possible and supplement his home grown materials by high-protein commercial products. This does not mean he is using less feeding stuffs, but using them to a better advantage. Kentucky feeders used about twenty-eight thousand tons more of commercial feeds in 1926 than they did in 1925.

This bulletin covers in a brief way the results of the inspection and analysis of these feeds for 1926. In addition, it also contains other material that should be of distinct interest and value to the feeder and the manufacturer.

Over 260 thousand tons of commercial feeds were consumed in the State in the period covered by this bulletin. This does not include whole grains and hays. Of this amount, it is estimated that at least 70% was imported into the State, leaving only 30% to be produced within the State. On the whole, commercial feeds are of much better quality than formerly, but there is quite a tonnage of very poor feeds consumed in the State by the uninformed and unsuspecting feeder who will buy on price rather than quality. A large portion of these low-grade feeds are manufactured by what may be termed "transient" manufacturers and sold by jobbers. Of course, many of the better class of manufacturers are forced to make them, to compete with this cheap class of feed.

In the application of the results set forth herein, the Department offers the following suggestions with a view of assisting dealers and feeders in the selection of their feeds, either for the purpose of supplementing home grown materials or as a balanced ration.

1. Dealers should buy only from manufacturers who have a good record and are complying with the feed law.

2. Feeders should buy only from reputable dealers who have a good record and are complying with the feed law of Kentucky by having every bag of feed properly labeled.

3. The feeder should ascertain what his animals need and what will supply these needs, as no animal will give good results without proper food.

4. If in doubt as to what the animal needs, he should consult the Kentucky Agricultural Experiment Station of the College of Agriculture, or some other good authority.

5. He should buy no commercial feed that is not registered and tagged with a Kentucky official tag, giving the manufacturer's guaranty to the State and buyer. He should note carefully the system of tagging.

6. He should read and study carefully the list of ingredients to see if the feed contains a material of little or no feeding value, such as oat hulls, oat clips, cob meal, screenings refuse, weed seeds and cheap and highly fibrous materials.

7. He should keep in mind that high-grade feeds are the most economical.

8. Many of the commercial feeds sold in Kentucky are very low grade and are unbalanced and do not furnish animals with proper nourishment. The use of such feeds often results in a hardship to the animal and a loss to the owner.

9. The value of a feed depends upon that portion of the nutrient which an animal, under ordinary circumstances and conditions, can digest and take into its system for building up the growth, keeping up the heat and energy and repairing the natural waste of the body. Quality feeds will best serve this purpose.

10. The amounts of crude protein, fat and fiber in a feed will serve only partly as a guide in selecting feeding stuffs. The buyer should base his final conclusion on the amount and quality of digestible nutrients. (See standard text books on feeds and feeding, or consult the Experiment Station.)

11. Cane molasses makes an excellent addition to a feed, giving both added food value and palatability, but it is too frequently used for the purpose of covering up adulterants (cheap, trashy and highly fibrous materials) in mixed feeds.

12. The yellow-tag feeds contain a material of little or no feeding value. As a general rule, it is not economical to buy such feeds.

The scope of scientific feeding for all classes of stock is widening. This is indicated by the great variety of feeds found

on the market and information sought by dairymen, stockmen generally, farm bureaus, co-operative organizations, county agents and similar agencies. The information sought covers mineral feeds, dog feeds, feeds suspected of being poisonous and feed rations for all classes of animals. In this respect the Department has been in greater demand than in any previous year.

For the year, 1026 samples were analyzed. Of this number, 271 were sent in by consumers and dealers for examination for purity and quality. This is an indication of the growing interest of the feeder. One hundred and twenty-seven samples of a miscellaneous nature were analyzed for other departments of the Experiment Station and the University, feed chemists of other states and Association of Official Agricultural Chemists work.

In the following tabulation the feeds sold in Kentucky during the year are grouped according to class, with the tonnage computed from tax tags issued.

	Tons	Tons
Horse and Mule Feed		21,900
Dairy Feed:		
16½% Protein	17,325	
20% Protein	7,475	
24% Protein	13,965	
		39,765
Poultry Grains:		
Scratch	23,700	
Chick	5,375	
		29,075
Pigeon Feed		575
Poultry Mash:		
Laying	7,425	
Growing	2,100	
Starting	2,475	
Fattening	4,175	
		16,175
Calf Meal		375
Hog Feed		2,775
Sheep Feed		75
Dog Food		50
General Stock Feed		2,700

	Tons	Tons
Cottonseed Meal:		
41% Protein	13,875	
43% Protein	3,375	
36% Protein	400	
		17,650
Wheat Bran		7,150
Wheat Middlings, Shorts		18,075
Mixed Wheat Feed		23,925
Red Dog		350
Flour Middlings		725
Miscellaneous Wheat Feeds		4,785
Cracked Corn, Corn Chop		16,275
Corn Feed Meal		2,625
Hominy Feed, Hominy Meal		5,425
Corn By-Product Feed		25
Corn Bran		225
Crushed Ear Corn		75
Mixed Feed (Wheat and Corn By-Products)		36,500
Tankage		2,875
Meat Meal		725
Blood Meal		25
Bone Meal		300
Linseed Oil Meal		1,325
Alfalfa Meal		150
Beet Pulp		350
Brewers' Grains		125
Dried Buttermilk, Semi-solid		685
Ground Oats		1,000
Miscellaneous		1,500

MINERAL FEEDS

Mineral matter in commercial feeding stuffs is often spoken of as ash. It has been shown that animals fed rations freed from mineral matter, so far as it is possible, will soon die of mineral starvation. It is found that animals deprived of mineral matter will die sooner than when no food is given. Mineral matter, therefore, is of vital importance to animals. It is necessary in every ration, and the common feeding stuffs contain all the necessary mineral substances, tho they may be in very small amounts. The proportions of these substances in the common feed materials

vary materially according to the kind of plant, the portion of the plant used, and other conditions. In some regions and under certain circumstances a deficiency of mineral matter in feeds may occur, but this is not generally the case, and there is need for discrimination in determining whether animals require mineral feed supplementary to the ration, other than common salt.

A very general interest in the subject of supplementary mineral feeds has been aroused, largely on the basis of suggestions rather than evidence, and a flourishing business in these products is the result. The sale of these products does not stop with the serving of actual requirements where deficiencies exist but, thru propaganda and other means, the manufacturers of these mixtures have exacted an enormous sum from the uninformed feeders of Kentucky and other states as well. The use of expensive proprietary mineral mixtures is not necessary and generally proves uneconomical.

The Association of Feed Control Officials at its annual meeting in 1926 approved the following uniform classification and labeling of mineral mixture feeds:

(a) That mixed feed containing both feed and more than 5 per cent of mineral ingredients requires, in addition to the usual declaration of the chemical feed analysis, a declaration of each ingredient contained therein and the minimum percentages of lime (CaO), phosphoric acid (P_2O_5), iodine (I) and the maximum percentage of salt (NaCl) if same are added. If minerals predominate in the mixture the usual declaration of the chemical feed analysis, with the exception of protein, may be omitted.

(b) That mineral feeds containing no organic ingredient do not require the usual chemical feed guarantee, but do require a declaration of each ingredient contained therein and the minimum percentage of lime (CaO), phosphoric acid (P_2O_5), iodine (I), and the maximum percentage of salt (NaCl) if the same are present.

(c) That the mineral ingredients be stated in the common English terms, if any such terms exist.

(d) It being impossible to classify separately the drug ingredients and the mineral ingredients, be it resolved:

(1) That all mixtures containing mineral ingredients generally regarded as dietary factors essential for the normal nutrition of animals and which are sold or represented for the primary purpose of supplying these minerals as correctives to rations in which these same mineral factors may be deficient, be classified as mineral feeds.

(2) That all other preparations which are sold or represented primarily for the cure, mitigation or prevention of disease be classified by this association as drugs or medicines.

THE COMPOSITION OF FEEDING STUFFS AND EXPLANATION OF TERMS USED

The law of the State requires a statement of the percentages of protein, fat and fiber in any feed, the idea being that this information, along with the other data covering the ingredients, would protect the purchaser and enable him to intelligently buy his feed. But a careful preparation of a ration requires a more complete knowledge of the composition of feeding stuffs. Besides protein, fat and fiber, the ordinary "complete" analysis consists in making the following additional determinations: water, ash and nitrogen-free extract.

Sometimes special determinations must be made. For example, in molasses feeds, it is often necessary to know the sugar and moisture contents. In feeding materials such as silage, it is desirable to know the acidity, since this determination is an index as to the palatability of the material. In animal materials, the amount of phosphate is determined in order to ascertain whether the material should be classified as a meat material or a meat and bone mixture. In feeds containing screenings, sweepings, dust and refuse from mills and elevators, it is very desirable to determine the amount of sand.

Protein is the name given to organic nitrogenous materials essential to plant and animal life. It contains about 16 per cent. of the element nitrogen and its amount is obtained simply by

multiplying the amount of total nitrogen found by analysis, by the factor, 6.25. Protein is the most important as well as the most costly constituent in a feed and the value of the feed depends very largely on the amount of this constituent it contains. It produces flesh, muscle, ligaments, glandular secretions, milk, blood, tendons, hair, hoof, hide, and is found in all parts of the animal body, including the bones which contain 25 or 30 per cent.

Fat is that part of a feeding stuff soluble in ether. It covers fats, oils, wax, resins and chlorophyl, the last three of no importance and present only in minute quantities. Fats produce heat and energy, their value for such being 2¼ times greater than that of either carbohydrates or protein. Therefore, they serve to prevent undue waste of protein in the body. The fatty tissues by forming a cushion, also serve as a protection to the other tissues of the body.

Fiber, the insoluble carbohydrate, is the woody portion or structural material of plants and grains and outer grain coatings. When present in large quantities it exerts a retarding influence on the digestion of nutrients present in feeding stuffs, as it is itself only partially digested by animals. Its chief value appears to lie in its mechanical effect in the intestinal tract.

Ash contains the inorganic or mineral constituents which are present in all feeds. These mineral constituents form the bony structures and are found in all the vital tissues and secretions of the animal body. Their importance may be realized when we recall experiments which show that animals deprived of mineral matter generally die sooner than when no feed is given them at all. Some of the more important mineral constituents found in plants are compounds of sulfur, chlorin, phosphorus, potassium, sodium, calcium, magnesium, manganese and iron. Grains, seeds and tubers are deficient in calcium, sodium and chlorin. Legumes and the hay made from them, corn stover and the leafy parts of plants generally contain sufficient quantities of these substances. The common practise of giving salt to livestock supplies the need for sodium and chlorin.

Water is composed of hydrogen and oxygen. The amount of water in a commercial feeding stuff depends upon the character of the materials from which the feed is made, their age or state of greenness, the process of manufacture and atmospheric conditions. Some by-product feeds have had their original water content altered. The amount of water in sweet feeds is affected by the amount of molasses they contain and the water content of the same.

The presence of water in commercial feeding stuffs adds nothing to their value as food because the animals receive their supply of water from other sources. Any amount of water other than that necessary to keep the feeding stuff in proper condition, reduces the value of the feed by reducing the percentages of the desirable substances. An excessive amount of water lowers the keeping qualities of the feed.

Nitrogen-free Extract is that part of carbohydrates which remains after deducting the crude fiber. It contains the easily digestible carbohydrates; therefore, knowledge of the amount present is important. The chemist estimates the percentage of nitrogen-free extract by subtracting from 100 the sum of the percentages of water, ash, protein and fiber found by analysis.

Nitrogen-free Extract is of importance as a source of heat, nervous and muscular energy. While it does not have as great a power in this respect as fat, it is present in such large quantities in feeds that it serves an important part. The members of this group of constituents differ in nutritive value on account of the wide variance in their digestibility. The starches and sugars are readily soluble and almost completely digested, while pentosans and other less well known substances are digested with much more difficulty and less completely. Nitrogen-free extract is converted into fats in the animal body and any excess over the immediate needs of the body is stored as fat in the tissues.

Carbohydrates, as noted above, is the sum of the Crude Fiber and Nitrogen-free Extract.

MICROSCOPICAL ANALYSIS

Every sample of feed that comes into the laboratory is subjected to a microscopical examination. The purpose of this examination may be summed up as follows:

(a) To see what products are present in the feed.
(b) To help interpret the results of the chemical analysis.

(From results accomplished it is apparent that the importance of microscopical examination of feeding stuffs is increasing each year.)

Feeds sold on the market are made from grains, grain products, various by-products, and roughages. These products may be sold unmixed or in mixtures of from two to a dozen or more materials. Molasses and small amounts of salt and other minerals are frequently added to these mixtures. By a microscopical examination it is determined what materials are present in a feed, and knowledge obtained of the proportions in which they are mixed. The microscopist also notes the physical condition of the feed, its odor, the kind and quality of the materials used, and if any objectionable materials are present.

The products from which feeds are made vary not only in chemical analysis, but in palatability, digestibility, purity, etc. Hence, it is not only highly desirable to know how much protein, fat and fiber are present in a feed, but the source of these nutrients as well. For example, in a feed that analysis shows to be high in fiber, it is desirable to know whether this fiber is due to the presence of alfalfa meal or to oat hulls. Again, if a feed is shown by analysis to be low in protein, the question arises as to whether this low protein is due to an inferior low-protein adulterant or to wheat flour, a product low in protein, but highly digestible, and therefore relatively desirable. The microscopical examination shows which of these products is present.

The chemical and microscopical examinations go hand in hand in the detection of adulterants. If a feed diverges widely

from the guaranty as to chemical constituents, it is a strong indication that some ingredient has been left out, something added, or the proportions of the ingredients materially changed. The microscopical examination shows the nature of these changes.

DEFINITIONS OF FEEDING STUFFS

The Association of Feed Control Officials has formulated definitions in most part for feed terms in general use. These definitions are followed as closely as possible where conditions in Kentucky will permit. These definitions are published in Bulletin 268--Commercial Feeding Stuffs in Kentucky in 1925, by the Kentucky Agricultural Experiment Station. Copies may be secured on application.

STANDARDS AND REQUIREMENTS

Definitions of by-product feeds and feed terms have served a useful purpose in standardizing these products, but definitions alone are not always sufficient to assure quality.

In formulating definitions, the Association of Feed Control Officials found it necessary in many instances to use chemical standards as part of the definitions in order to give a more distinctive qualification of the products. Many of the State officials have gone further than these definitions and have adopted minimum chemical standards for the more common feed materials and a few officials have gone further and established minimum chemical standards for some of the more important special purpose stock feeds. In the case of either standard by-products or special purpose mixed stock feeds, chemical standards are made in order to insure better quality by eliminating as far as possible an admixture of inferior, waste and highly fibrous materials.

The standards now in effect in Kentucky are:

CHEMICAL STANDARDS

		Minimum Protein	Minimum Fat	Maximum Fiber
1.	**Standard By-Products:**			
	Mixed Wheat Feed	15.50%	4.00%	8.50%
	Wheat Bran	14.50%	3.75%	10.00%
	Brown Wheat Middlings or Shorts	16.00%	4.00%	7.50%
	Gray Wheat Middlings or Shorts	16.00%	4.00%	6.50%
	White Wheat Middlings or Shorts. Flour Middlings	16.00%	3.75%	4.00%
	Corn Feed Meal	8.00%	3.75%	5.00%
	Cracked Corn	8.00%	3.50%	3.00%
	Hominy Meal, Hominy Feed or Hominy Chop	10.00%	7.00%	6.00%
	Alfalfa Meal	.....	.....	32.00%
	Rye Middlings	.....	.....	6.00%
	Ground Barley	.....	.....	6.50%
	Ground Oats	.....	.....	12.00%
2.	**Special Purpose Mixed Feeds:**			
	Dairy Feed	15.00%	3.00%	16.00%
	Horse and Mule Feed	9.00%	2.00%	15.00%
	Hog Feed	14.00%	3.50%	7.00%
	Laying Mash	18.00%	3.50%	8.00%
	Scratch Feed	.....	.....	5.00%

REGISTRATION REQUIREMENTS

3. **General Requirements:**

(a) In making registrations, care should be exercised that the chemical guaranties will be reasonably close to the actual content of the feed. In other words, arbitrary guaranties will not be accepted.

(b) If a material change is made in the guaranty of a feed, in effect lowering the value of the feed, the name of the feed must be changed also.

(c) For oil mill by-products and digester tankages, the percentage of protein must form part of the name. For example, 41% Cotton Seed Meal, 34% Old Process Linseed Oil Meal, 60% Digester Tankage, etc.

(d) Oil mill by-products containing hulls, screenings and similar materials, thus materially lowering the percentage of crude protein, cannot be called meals, but may be called meal and hulls, or meal and screenings, or feed, or by some proprietary name.

(e) Any feed containing less than 9% protein must be called by the names of its ingredients.

4. **Essential Organic Ingredients:**
A feeding stuff must not contain less than 3% of any essential organic food ingredient listed in the guaranty. If an ingredient so listed is found to be less than 3%, the feed will be classed as misbranded.

5. **Mineral Ingredients:**
Mineral ingredients, generally regarded as dietary factors essential for the normal nutrition of animals, when added to a ration, must not exceed 3%.

6. **Grit and Shell:**
The maximum amount of grit and shell, or of either, if only one is present, must not exceed 3%.

7. **Salt:**
The amount of salt in all stock and poultry feeds should not exceed 1%.

8. **Screenings:**
(a) Percentage of screenings in wheat feeds and statement whether ground or unground, must be given.
(b) In stock feeds the percentage of screenings and a statement whether ground or unground, is required and the percentage of weed seeds they contain must be given also. If the screenings have been "reworked" or "reconditioned," they must be called **screenings refuse.**

9. **Materials of Little or No Feeding Value:**
Percentage of material of little or no feeding value must be stated.

OFFICIAL TAG

Feeders should examine carefully the official tag before they buy their feeds. If the feed is not tagged with a Kentucky tag the buyer should not accept it. Buy only on the guaranty the tag carries, as this is the official guaranty to the State and purchaser. Claims of salesmen and statements made in advertising matter that are not in accordance with the guaranty on the official tag should be disregarded.

SYSTEM OF TAGGING

A purchaser should not only scrutinize closely the guaranty printed on the tag but he should observe the color system in tagging also, which is intended to give him additional warning and an opportunity to further investigate the make up of the feed before he accepts it. The color system is:

First, a manila tag printed in black ink represents a feeding stuff made of the products or by-products of one grain or plant only, such as wheat, or corn, or cotton seed, etc. For example, wheat shorts, mixed wheat feed, wheat bran, cottonseed meal or corn feed meal would bear manila tags printed with black ink. Such feeds are commonly known as "straight" feeds.

Second, a manila tag printed in red ink indicates that the feeding stuff is made of the products or by-products of two or more grains or plants, such as corn and wheat, or corn, wheat and cottonseed meal, etc. For example, a combination of corn feed meal, wheat bran, alfalfa meal, molasses and cottonseed meal would take a manila tag printed with red ink.

Third, a yellow tag printed in black ink indicates that a feeding stuff contains a material of little or no feeding value, or a material not classified as a concentrate, such as oat hulls, corn cob meal, peanut hulls, cottonseed hulls, flax-plant refuse, clipped oat by-product, peat, grain screenings, etc.

TABLE I.—Average Composition of the More Common Feeding Stuffs.

	Pounds in 100					
					Carbohydrates	
	Water	Ash	Protein	Fat	Fiber	N. F. Extract
Alfalfa meal	8.8	9.0	14.3	2.0	30.1	35.8
Barley	9.3	2.7	11.5	2.1	4.6	69.8
Beet pulp, dried	8.2	3.5	8.9	0.9	18.9	59.6
Blood, dried	9.7	3.3	82.3	0.9	.....	3.8
Bone meal, raw	7.3	61.7	24.3	3.1	.....	3.6
Brewers' dried grains	8.2	3.8	23.1	6.4	15.0	43.5
Buckwheat	12.1	2.1	10.8	2.5	10.3	62.2
Buttermilk, dried	4.5	8.1	34.6	12.6	.....	50.9
Buttermilk, semi-solid	65.0	2.7	13.4	3.0	.....	15.9
Corn	10.8	1.5	9.5	4.1	2.0	71.7
Corn and cob meal	10.4	1.5	8.5	4.1	7.9	67.6
Crushed ear corn with husks	11.0	1.8	7.5	3.0	7.8	68.9
Corn chop	10.5	1.5	8.3	3.5	1.4	75.5
Corn feed meal	10.5	1.5	9.4	4.5	2.7	71.1
Corn gluten feed	8.7	2.1	25.4	3.8	7.1	52.9
Corn gluten meal	9.1	1.1	35.5	4.7	2.1	47.5
Cottonseed meal 43%	7.5	6.2	43.0	7.2	9.7	26.4
Cottonseed meal 41%	7.5	6.2	41.0	7.3	10.7	27.1
Cottonseed meal 38½%	7.5	6.4	38.5	7.7	13.4	26.3
Cottonseed feed 36%	7.5	6.6	36.0	7.4	15.3	26.6
Cottonseed feed 22%	8.3	4.9	22.0	6.3	21.4	34.6
Cowpeas (seed)	11.6	3.4	23.6	1.5	4.1	55.8
Distillers' dried grains (chiefly corn)	6.6	2.6	30.7	12.2	11.6	36.3
Flaxseed	9.2	4.3	22.6	33.7	7.1	23.2
Hominy meal, feed or chop	10.1	2.6	11.3	9.3	5.5	61.2
Kafir corn	11.8	1.7	11.1	3.0	2.3	70.1
Linseed oil meal (new process)	9.6	5.6	36.9	2.9	8.7	36.3
Linseed oil meal (old process) 34%	9.1	5.4	34.0	7.5	8.4	35.7
Malt sprouts	7.6	6.1	26.4	1.5	12.6	45.6
Meat scraps 50%	8.0	6.5	50.0	10.5	7.5	2.6
Meat and bone meal	7.0	35.4	45.0	4.1	8.5	.....
Millet seed	9.1	3.3	11.8	3.3	7.8	64.7
Molasses, beet	22.0	7.0	9.0	.....	.....	62.0
Molasses, cane	25.7	6.1	3.2	.....	.....	65.0
Oats	10.4	3.4	11.5	4.6	11.0	60.9
Oat kernels	6.9	2.2	14.3	8.1	1.4	67.1
Peanut oil meal	6.6	4.8	44.8	10.2	7.6	26.0
Rice bran	10.0	9.5	12.0	10.0	12.0	47.5
Rye	9.4	2.0	11.8	1.8	1.8	73.2
Soybeans (seed)	9.9	5.3	36.5	17.5	4.3	26.5

TABLE I.—Continued.

	Pounds in 100					
					Carbohydrates	
	Water	Ash	Protein	Fat	Fiber	N. F. Extract
Soybean meal 43%	10.5	4.9	43.0	6.6	5.3	29.5
Sunflower seed	6.9	3.1	16.1	24.7	27.9	21.3
Tankage 60%	7.9	15.3	60.0	7.0	1.4	6.8
Tankage 50%	8.3	21.8	50.0	11.7	1.5	6.8
Wheat	10.2	1.9	12.4	2.1	2.2	71.2
Wheat bran	10.1	6.3	15.4	4.7	9.1	54.4
Mixed wheat feed	10.1	5.2	16.2	4.4	8.3	56.9
Wheat middlings, brown	10.3	5.4	16.9	4.5	7.3	56.1
Wheat middlings, gray	10.5	4.4	16.7	4.6	5.8	58.4
Wheat flour middlings	10.7	3.7	17.8	5.0	4.0	58.1
Wheat flour, red dog	11.0	1.5	14.1	3.2	2.0	68.2
Wheat flour, patent	12.3	0.5	10.9	1.3	0.4	74.6
Roughages						
Alfalfa hay	8.6	8.6	14.9	2.3	28.3	37.3
Clover, red	12.9	7.1	12.8	3.1	25.5	38.7
Soybean hay	8.6	8.6	16.0	2.8	24.9	39.1
Timothy hay	11.6	4.9	6.2	2.5	29.8	45.0
Corn stover (ears removed)	9.4	5.8	5.9	1.6	30.7	46.6
Fillers						
Buckwheat hulls	10.3	2.1	4.4	1.0	43.7	38.5
Corn bran	10.0	2.4	9.7	5.7	9.8	62.4
Corn cob	10.0	1.5	2.0	0.4	31.8	54.3
Cottonseed hulls	9.7	2.7	4.6	1.9	43.8	37.3
Flax screenings	8.8	8.2	15.4	11.8	15.5	40.5
Oat hulls and oat shorts	7.5	5.0	6.0	2.1	26.5	52.9
Oat hulls	6.8	6.0	4.0	1.7	29.2	52.3
Peanut hulls	9.1	5.5	7.3	2.6	56.6	18.9
Rice hulls	9.3	16.9	3.3	1.1	35.4	34.0
Velvet bean hulls	13.2	6.1	11.6	1.9	24.5	42.7
Wheat chaff	14.4	7.2	4.2	1.4	28.0	44.8
Wheat screenings	10.2	3.9	13.3	4.1	7.4	61.1

TABLE II.—Average Digestibility of the Nutrients in Common Feeding Stuffs, Taken from "Feeds and Feeding," by Henry and Morrison. (This table is copyrighted and is quoted by permission of the publishers.)

Feeding Stuff	Crude Protein %	Fat %	Carbohydrates	
			Fiber %	Nitrogen-free Extract %
Alfalfa	71	38	43	72
Barley	78	78	56	92
Beet pulp, dried	52	.....	83	83
Blood, dried	84	.....	.....	.....
Bone meal, raw	92	97	.....	.....
Brewers' grain, dried	81	89	49	57
Buckwheat	75	100	24	76
Buttermilk, dried	85	49	.....	81
Clover, red	59	57	54	66
Corn, whole ground	74	93	57	94
Corn and cob meal	52	84	45	88
Corn gluten feed	85	85	76	88
Corn gluten meal	85	93	55	90
Corn stover	37	62	66	59
Cottonseed feed	58	90	45	61
Cottonseed meal, choice and prime	84	95	37	75
Distillers' dried grains	73	95	95	81
Flaxseed	91	86	60	55
Hominy feed or meal	66	91	76	90
Kafir corn	81	77	55	92
Linseed meal (new process)	86	95	73	87
Linseed meal (old process)	89	89	57	78
Malt sprouts	77	85	87	80
Meat scraps	93	98	.....	.....
Meat and bone meal	85	.....	.....	.....
Millet seed	59	80	41	84
Molasses, cane	32	.....	.....	90
Oats	78	87	35	81
Peanut cake from hulled nuts	90	90	9	84
Rice bran	65	77	25	79
Rye, ground	84	64	.....	92
Soybeans, ground	91	92	75	81
Soybean oil meal	92	68	99	100
Sunflower seed	84	82	.....	.....
Tankage (with swine)	71	100	.....	100
Wheat, ground	74	72	59	93
Wheat bran	78	68	31	72
Wheat mixed feed	77	87	36	76
Wheat middlings or shorts	88	86	36	88
Wheat red dog flour	80	70	60	83
Wheat flour, patent	74	69	.....	.....

TABLE II.—Continued.

Feeding Stuff	Crude Protein %	Fat %	Carbohydrates	
			Fiber %	Nitrogen-free Extract %
Fillers				
Buckwheat hulls	9	10	.....	62
Corn bran	60	80	71	80
Corn cob	19	50	60	52
Cottonseed hulls	6	79	47	34
Oat hulls and oat middlings	75	78	42	46
Peanut hulls	6	80	.....	.....
Rice hulls	10	67	1	35
Wheat chaff	26	43	39	33

SUMMARY

The names of the manufacturers whose feeds have been analyzed are given in alphabetical order in the following pages. The results are summarized without stating percentages found by analysis. If a brand of feed was found to be up to the standard guaranteed, or even exceeded it, the term "equaled guaranty" is used. In the same manner, if a feed is not up to the standard guaranteed, the results are summarized in statements like the following: "too low in protein," "too low in fat," "too high in fiber," "adulterated," "misbranded," "list of ingredients not as guaranteed," and other brief statements of facts.

Acme-Evans Co., Indianapolis, Ind. Inspection samples analyzed, 15.
- Homlik, 1; equaled guaranty.
- Acme Feed, 3; 1 too low in protein.
- Acme Farm Feed, 1; equaled guaranty.
- Acme Stock Feed, 3; 1 too low in protein and too high in fiber; inferior product.
- Acme Dairy Feed, 4; equaled guaranty.
- D-Light-U Dairy Feed, 3; 1 too low in protein; 1 too high in fiber; 2 no corn gluten feed present; 1 no linseed meal present.

Adairville Milling Co., Adairville, Ky. Inspection sample of Shipstuff analyzed, 1; equaled guaranty.

Alfocorn Milling Co., St. Louis, Mo. Inspection samples analyzed, 6.
- Alfocorn Egg Mash, 1; equaled guaranty.
- Full Pail Dairy Feed, 3; 1 contained oat by-product.
- Alfocorn Horse Feed, 1; too low in protein; no linseed oil meal present.
- Alfocorn Hog Fatner, 1; hominy feed substituted for corn meal.

The Allen & Wheeler Co., Troy, Ohio. Inspection sample of Trojan A-1 Farm Feed analyzed, 1; equaled guaranty.

American Coal & Feed Co., Louisville, Ky. Inspection sample of American Scratch Feed analyzed, 1; no buckwheat or barley present; wheat inferior; misbranded.

American Linseed Co., New York, N. Y. Inspection sample of Alinco Old Process Linseed Meal 34% analyzed, 1; equaled guaranty.

American Milling Co., Peoria, Ill. Inspection samples analyzed, 3.
- Sucrene Dairy Feed, 1; too high in fiber; contained flax plant by-product.
- Tip Top Sugared Feed, 2; equaled guaranty.

American Packing Co., St. Louis, Mo. Inspection sample of "Circle A Brand" 60% Digester Meat and Bone Tankage analyzed, 1; equaled guaranty.

Anderson & Spilman, Danville, Ky. Inspection sample of Anderson & Spilman Feed analyzed, 1; equaled guaranty.

The Ansted & Burk Co., Springfield, O. Inspection samples analyzed, 3.
Middlings & Screenings, 1; equaled guaranty.
Virginia Farm Feed, 1; equaled guaranty.
Corn By-Product Feed, 1; too low in protein and fat.

Arcady Farms Milling Co., Chicago, Ill. Inspection samples analyzed, 3.
Arcady Dairy Feed, 1; too high in fiber.
Provo Dairy Feed, 1; corn feed meal added.
Wonder Laying Mash, 1; too high in fiber; no corn gluten feed present.

Armour & Co., Chicago, Ill. Inspection samples of Armour's 60% Meat Meal analyzed, 2; equaled guaranty.

Ashbrook Milling Co., Mattoon, Ill. Inspection sample of Peerless Milk Producer analyzed, 1; too high in fiber; contained flax plant by-product.

Ashland Grocery Co., Ashland, Ky. Inspection sample of Standard Feed analyzed, 1; contained excess screenings and weed seeds.

Aubrey & Co., Louisville, Ky. Inspection samples analyzed, 20.
Aubrey's Wheat Bran & Screenings, 3; 2 equaled guaranty; 1 too low in protein.
Blackhawk Mixed Wheat Feed & Screenings, 2; equaled guaranty.
Blackhawk Feed & Screenings, 2; contained ground weed seeds.
Red "A" Wheat Feed & Screenings, 4; 2 too low in protein and contained ground weed seeds; 1 too low in fat.
Big "A" Sweet Feed, 2; contained added corn product.
Monarch Sweet Feed, 1; contained screenings refuse.
Monarch 16½% Protein Feed, 2; 1 corn feed meal added.
85% Grain Horse Feed, 1; too low in fat.
Red "A" Horse Feed, 1; equaled guaranty.
Aubrey's Scratch Feed, 1; only a trace of oats present.
Hominy Feed, 1; adulterated with corn bran; below guaranty in every respect.

J. J. Badenoch Co., Chicago, Ill. Inspection samples analyzed, 5.
Egg-A-Day Dry Mash, 1; only trace of ground barley present.
Jay Bee Dairy Feed, 1; equaled guaranty.
Milky Way Dairy Feed (with Beet Pulp), 1; equaled guaranty.
Sweet Honey Bee Dairy Feed, 2; 1 no alfalfa meal present.

J. H. Baker, Drakesboro, Ky.. Inspection sample of Shipstuff & Screenings analyzed, 1; too low in protein.

Ballard & Ballard Co., Louisville, Ky. Inspection samples analyzed, 12.
Ballard's Bran, 1; too low in protein.
Ballard's Mixed Wheat Feed & Screenings, 2; 1 too low in protein.
Kentucky Farm Feed & Screenings, 3; 2 too low in protein and contained excess screenings.
Insurance Scratch Grains, 1; ingredients not as guaranteed.
Ballard's Insurance Laying Mash, 2; equaled guaranty.
Sweet Insurance Feed, 1; equaled guaranty.
Milk Insurance Feed, 2; equaled guaranty.

Bardstown Milling Co., Bardstown, Ky. Inspection samples analyzed, 3.
Royal Dairy Feed, 1; equaled guaranty.
Royal Pig Feed, 2; equaled guaranty.

J. H. Baughman & Co., Stanford, Ky. Inspection sample of Mixed Mill Feed analyzed, 1; contained added wheat flour and corn feed meal.

Beaver Dam Milling Co., Beaver Dam, Ky. Inspection sample of Mixed Feed analyzed, 1; equaled guaranty.

Big Clifty Milling Co., Big Clifty, Ky. Inspection sample of Wheat Bran analyzed, 1; equaled guaranty.

Big Diamond Mills Co., Minneapolis, Minn. Inspection samples of Big Diamond Wheat Middlings & Screenings analyzed, 2; 1 too low in protein and too high in fiber; sample is finely ground wheat bran; misbranded.

Bisbee Linseed Co., Chicago Heights, Ill. Inspection samples analyzed, 2.
Bisbee 34 Per Cent, 1; equaled guaranty.
32% Old Process Linseed Oil Meal, 1; equaled guaranty.

Black & White Milling Co., E. St. Louis, Ill. Inspection sample of Black & White 24% Protein Dairy Feed analyzed, 1; contained added wheat bran; no corn germ meal present.

Blish Milling Co., Seymour, Ind. Inspection sample of Bull's Eye Mixed Wheat Feed analyzed, 1; too low in protein.

Bloomfield Mill & Grain Co., Bloomfield, Ky. Inspection sample of Ful-Pail Dairy Feed analyzed, 1; too high in fiber; oat by-product substituted for ground oats; contained corn cob.

Blue Grass-Elmendorf Grain Corporation, Lexington, Ky. Inspection samples of "Blue-Elm" Peerless Cow Feed analyzed, 2; too low in protein; 1 too low in fat and contained screenings.

Bowling Green Milling Co., Bowling Green, Ky. Inspection sample of Mixed Feed analyzed, 1; equaled guaranty.

F. W. Brode Corporation, Memphis, Tenn. Inspection samples analyzed, 8.

Owl Brand 41% Prime Cottonseed Meal, 5; 2 equaled guaranty; 2 too low in protein; 3 too high in fiber; 2 color slightly dark and hulls in excess.

Owl Brand 43% Prime Cottonseed Meal, 3; 2 too low in protein; 1 too high in fiber.

Chas. Broeker & Co., Owensboro, Ky. Inspection samples analyzed, 3.

Hominy Feed, 2; equaled guaranty.

XX Mixed Feed, 1; equaled guaranty.

Bryant's Roller Mills, Calhoun, Ky. Inspection sample of Mixed Wheat Feed analyzed, 1; too low in protein.

The Buckeye Cotton Oil Co., Cincinnati, O. Inspection samples of 41% Protein Cottonseed Meal analyzed, 2; equaled guaranty.

Burnside Roller Mills, Burnside, Ky. Inspection sample of Mixed Feed analyzed, 1; too low in protein.

Cadick Milling Co., Grandview, Ind. Inspection sample of Mixed Wheat Feed analyzed, 1; equaled guaranty.

Cannelton Flour Mills, Cannelton, Ind. Inspection sample of Shipstuff & Screenings analyzed, 1; equaled guaranty.

Carey Bros., Willisburg, Ky. Inspection samples of Mixed Feed analyzed, 2; 1 too low in protein and fat and contained wheat srceenings.

Carlisle Mill & Supply Co., Carlisle, Ky. Inspection sample of Old Kentucky Mill Feed analyzed, 1; too high in fiber.

Cecilian Milling Co., Cecilia, Ky. Inspection samples analyzed, 6.

Mixed Feed, 4; too high in fiber; 1 too low in protein; 1 too low in fat; 1 contained rice bran; 3 ingredients not as guaranteed—misbranded.

Flour Middlings, 2; 1 too low in protein; 1 too high in fiber.

Charleston Milling & Produce Co., Charleston, W. Va. Inspection samples analyzed, 6.

Mixed Feed, 1; too low in protein; contained excess of corn bran.

Quality Wheat Middlings, 3; 1 too low in protein; 2 much too low in protein and adulterated with corn bran—misbranded.

Double Bar Laying Mash, 1; too low in protein and too high in fiber.

Double Bar Horse & Mule Feed, 1; equaled guaranty.

Cincinnati Grain & Hay Co., Cincinnati, O. Inspection samples analyzed, 4.

"No Better" Dry Egg Mash, 1; too low in protein and too high in fiber; only a trace of alfalfa meal present; contained ground wheat screenings; charcoal present and in excess.

"No Better" Horse & Mule Feed, 1; too low in protein.
60% Tankage, 2; equaled guaranty.

Citizens' Roller Mills, Somerset, Ky. Inspection sample of Mixed Feed analyzed, 1; too low in protein and fat and too high in fiber.

Clarkson Milling Co., Clarkson, Ky. Inspection sample of Wheat Shorts analyzed, 1; too low in protein and fat.

Climax Roller Mills, S. M. Long & Sons, Prop., Shelbyville, Ky. Inspection samples analyzed, 2.
Climax Mill Feed, 1; too low in protein; contained excess screenings.
Red Dog, 1; too low in protein and fat.

Columbia Milling Co., Columbia, Ky. Inspection sample of Mixed Feed analyzed, 1; equaled guaranty.

The G. E. Conkey Co., Cleveland, O. Inspection samples analyzed, 3.
Conkey's Buttermilk Grain & Bone Starting Feed, 1; less than 3% each of blood flour and buttermilk present.
Conkey's Buttermilk Meat, Grain & Bone Laying Mash, 1; too low in protein.
Conkey's Buttermilk Meat, Grain & Bone Growing Mash, 1; only trace of bean meal present.

The Corno Mills Co., E. St. Louis, Ill. Inspection samples analyzed, 14.
Corn Feed Meal, 1; equaled guaranty.
Corno Hen Feed, 1; equaled guaranty.
Nutro Hen Feed, 1; equaled guaranty.
Corno Laying Mash, 2; equaled guaranty.
Corno Premium Feed, 2; equaled guaranty.
Corno Stock Feed, 2; contained excess oat hulls; 1 too low in protein and too high in fiber.
Corno Dairy Feed, 2; equaled guaranty.
Nutro Sweet Feed, 1; too low in protein and fat; contained excess oat by-product.
Nutro Dairy Feed, 2; 1 contained excess oat by-product; 1 contained corn gluten meal.

Crawford & Snyder, Milton, Ky. Inspection sample of Shipstuff analyzed, 1; equaled guaranty.

Crown Jewel Milling Co., Cynthiana, Ky. Inspection sample of Mixed Feed analyzed, 1; equaled guaranty.

Dairyman's Feed & Supply Co., Mayfield, Ky. Inspection sample of Dairyman's Increase Dairy Feed analyzed, 1; equaled guaranty.

S. P. Davis, Little Rock, Ark. Inspection samples of "Goodluck Brand" 41 % Cottonseed Meal analyzed, 2; equaled guaranty.

Dixie Mills Co., E. St. Louis, Ill. Inspection samples analyzed, 3.
Dixie Laying Mash, 1; too high in fiber; no linseed oil meal present.
Dixie Cow Feed, 1; equaled guaranty.
Dixie Horse & Mule Feed, 1; equaled guaranty.

The Dorsel Co., Newport, Ky. Inspection sample of Dorsel's Special Feed analyzed, 1; too low in protein and fat; contained wheat screenings.

Dulle Meyer Milling Co., Chamois, Mo. Inspection sample of Red, White and Blue Middlings & Screenings analyzed, 1; equaled guaranty.

Early & Daniel Co., Cincinnati, O. Inspection samples analyzed, 14.
Rex Chick, 1; equaled guaranty.
Tuxedo Egg Mash, 2; 1 corn feed meal added.
Tuxedo Chop, 1; contained only traces of wheat bran and barley grains.
Cerealia Sweets, 2; equaled guaranty.
Rex Dairy, 1; too low in protein.
Tuxedo Dairy, 1; no hominy feed present.
Miami Dairy Feed, 5; 3 too low in protein.
Tuxedo Hog Ration, 1; equaled guaranty.

East St. Louis Cotton Oil Co., National Stock Yards, Ill. Inspection sample of St. Clair Brand 36% Cottonseed Feed analyzed, 1; too low in protein.

Eckert Packing Co., Henderson, Ky. Inspection sample of Eckert's Pigs' Delight Digester Tankage analyzed, 1; equaled guaranty.

Edinger & Co., Louisville, Ky. Inspection sample of 41% Choice Cottonseed Meal analyzed, 1; too high in fiber.

Elkhorn Roller Mills, Elkhorn, Ky. Inspection sample of Mixed Wheat Feed analyzed, 1; too low in protein.

Eminence Milling Co., Eminence, Ky. Inspection samples analyzed, 2.
Leader Mixed Feed, 1; contained excess of ground wheat screenings.
Leader Dairy Feed, 1; too high in fiber.

Evans Milling Co., Indianapolis, Ind. Inspection sample of Emco Hominy Feed analyzed, 1; equaled guaranty.

Exchange Milling Co., Sturgis, Ky. Inspection sample of Mixed Brans & Screenings analyzed, 1; too low in protein.

Falls City Ice & Beverage Co., Louisville, Ky. Inspection sample of Brewers' Dried Grains analyzed, 1; too high in fiber.

Farmers Mill Co., Columbia, Ky. Inspection sample of Shipstuff analyzed, 1; equaled guaranty.

The Farmers Mill, Clay, Ky. Inspection sample of Mixed Feed analyzed, 1; too low in protein.

Farmers & Merchants Milling Co., Brooksville, Ky. Inspection sample of Mixed Wheat Feed analyzed, 1; too low in protein.

Feed Marketing Co., St. Louis, Mo. Inspection sample of Scientific Dairy Feed 24% Protein analyzed, 1; too low in protein and fat.

Ferncliff Feed & Grain Co., Louisville, Ky. Inspection samples analyzed, 7.

Cracker Jack 21% Dairy Ration, 1; less than 3% ground oats present; contained ground screenings.

Cracker Jack Dairy Ration, 1; equaled guaranty.

"Sweet Sixteen" Dairy Feed, 1; equaled guaranty.

Cracker Jack Special Feed, 1; no wheat bran present.

P. D. Q. Special Feed, 1; too high in fiber.

Cracker Jack Horse & Mule Feed, 1; too low in protein.

P. D. Q. Mill Feed, 1; contained excess screenings containing large per cent of weed seeds.

The Fleischmann Co., Cincinnati, O. Inspection sample of Fleischmann Dried Malt Grains analyzed, 1; equaled guranaty.

Flemingsburg Mills, Flemingsburg, Ky. Inspection sample of Wheat Bran & Screenings analyzed, 1; equaled guranaty.

Henry Fruechtenicht, Louisville, Ky. Inspection samples analyzed, 2.

Blue Grass Dairy Feed, 1; contained large per cent of ground grain screenings.

Ground Oats, 1; too high in fiber; contained corn product.

C. R. Garner & Co., Amarillo, Texas. Inspection sample of Texama Brand 43% Cottonseed Meal analyzed, 1; too low in protein.

Garrard Mills, Lancaster, Ky. Inspection sample of Glen Lily Mixed Feed analyzed, 1; ground wheat substituted for wheat bran and wheat middlings.

Germantown Milling Co., Germantown, Ky. Inspection sample of Mixed Wheat Feed analyzed, 1; too low in protein.

Glass Milling Co., Wilmore, Ky. Inspection sample of Glass Hi-Grade Feed analyzed, 1; equaled guaranty.

Goldcamp Mill Co., Ironton, O. Inspection samples analyzed, 2.

Gainmor White Feed, 1; too high in fiber.

K-Y Feed, 1; equaled guaranty.

Golden Grain Milling Co., E. St. Louis, Ill. Inspection sample of Golden Grain Milk Producer analyzed, 1; too low in protein and too high in fiber; contained oat by-product.

Green Bros., Falls of Rough, Ky. Inspection sample of Mixed Feed analyzed, 1; equaled guaranty.

Green River Milling Co., Greensburg, Ky. Inspection sample of Mixed Feed analyzed, 1; equaled guaranty.

Green River Milling Co., S. Carrollton, Ky. Inspection sample of Green River Feed analyzed, 1; much too low in protein; too low in fat; contained corn meal.

Greendale Mills, Lawrenceburg, Ind. Inspection samples analyzed, 5.
Greendale Egg Mash with Dried Buttermilk, 1; too low in protein; no soybean meal present.
Greendale Hog Feed, 1; equaled guaranty.
Greendale 16% Dairy Feed, 1; too low in fat and too high in fiber.
Greendale 20% Dairy Feed (Sweet), 1; too low in protein.
Greendale 24% Dairy Feed, 1; much too low in protein.

Gwinn Bros. & Co., Huntington, W. Va. Inspection samples analyzed, 2.
Farm Feed, 1; equaled guaranty.
Fancy White Wheat & Rye Middlings & Screenings, 1; too low in protein and fat.

Hales & Hunter Co., Chicago, Ill. Inspection samples analyzed, 4.
Red Comb Mash Feed (with Dried Buttermilk), 1; no linseed oil meal or alfalfa meal present; contained corn gluten meal and ground wheat screenings.
Gold Flake Dairy Feed, 3; 1 no linseed oil meal present; contained corn meal.

R. L. Harrison & Son, Bagdad, Ky. Inspection samples of Empress analyzed, 3; 2 too low in protein.

The P. H. Harsha Milling Co., Portsmouth, O. Inspection samples of Harsha's Middlings & Screenings analyzed, 2; 1 too low in protein.

Haydon Mill & Grain Co., Springfield, Ky. Inspection sample of Economy Feed analyzed, 1; equaled guaranty.

Hirst & Begley Linseed Co., Chicago, Ill. Inspection sample of H. & B. L. Co. Brand 34% Linseed Meal analyzed, 1; equaled guaranty.

Hiseville Milling Co., Hiseville, Ky. Inspection sample of Mixed Wheat Feed analyzed, 1; equaled guaranty.

Hodgenville Roller Mills, Hodgenville, Ky. Inspection sample of Lincoln analyzed, 1; equaled guaranty.

Home Milling Co., Greenville, Ky. Inspection samples of Happy Home Mixed Feed analyzed, 2; 1 too low in fat; 1 too low in protein and ingredients not as guaranteed.

Hopkins Fertilizer Co., New Albany, Ind. Inspection sample of Hopkins 50% Meat Scraps analyzed, 1; equaled guaranty.

Hopkinsville Milling Co., Hopkinsville, Ky. Inspection sample of Middlings & Screenings analyzed, 1; equaled guaranty.

Horse Cave Mills, Horse Cave, Ky. Inspection samples analyzed, 2.
Superior Wheat Feed, 1; equaled guaranty.
Pure Bran & Shorts, 1; too low in fat.

Humphreys-Godwin Co., Memphis, Tenn. Inspection samples analyzed, 4.
"Dixie Brand" 41% Cottonseed Meal, 2; 1 too high in fiber.
"Bull Brand" 43% Cottonseed Meal, 2; 1 too low in protein.

Igleheart Bros., Evansville, Ind. Inspection samples analyzed, 2.
Pure Wheat Mixed Feed & Screenings, 1; equaled guaranty.
Pure Wheat Shorts & Screenings, 1; too low in fat.

International Sugar Feed No. Two Co., Memphis, Tenn. Inspection samples analyzed, 15.
International Jewel Egg Mash with Buttermilk, 1; too low in fat; contained ground oats.
International Jewel Growing Mash, 1; too low in protein and fat and too high in fiber; only trace of ground barley present.
International Jewel Horse Feed, 1; cottonseed meal added.
International Planters' Cattle Feed, 1; contained wheat middlings; not labeled according to law.
International Special Dairy Feed, 6; 2 too low in protein; 1 contained corn feed meal; 2 contained excess ground grain screenings; 1 only trace of linseed oil meal present; 2 ingredients not as guaranteed—misbranded.
International Makmeat Hog Feed, 5; 3 too low in protein; 4 no corn gluten feed present; 1 contained molasses.

Jellico Grocery Co., Corbin, Ky. Inspection samples analyzed, 2.
Cyclone Fine Feed, 1; not labeled according to law.
Red Bird Fine Feed, 1; too low in protein; contained ground weed seeds.

The Jersee Co., Minneapolis, Minn. Inspection sample of Just Right Egg Mash No. 1 analyzed, 1; too high in fiber.

The Joslin-Schmidt Co., Cincinnati, O. Inspection samples of Abattoir Brand 60% Digester Tankage analyzed, 2; equaled guaranty.

The E. Kahn's Sons Co., Cincinnati, O. Inspection sample of Kahn's Diamond K. 60% Digester Tankage analyzed, 1; equaled guaranty.

Keister Milling Co., Huntington, W. Va. Inspection samples analyzed, 2.
Fancy White Middlings, 1; too low in protein and fat and too high in fiber.
Lotus Wheat & Rye Middlings, 1; too high in fiber.

George Keller, Newport, Ky. Inspection sample of Corn Meal analyzed, 1; too low in fat.

Kellogg Co., Battle Creek, Mich. Inspection sample of Hexite Dairy Feed with Molasses analyzed, 1; equaled guaranty.

Kenton Hay & Grain Co., Latonia, Ky. Inspection sample of Wheat Middlings analyzed, 1; too high in fiber; contained ground wheat screenings and weed seeds.

Kentucky Feed & Grain Co., Louisville, Ky. Inspection samples analyzed, 30.

Premo Mixed Wheat Feed, 1; too high in fiber.

Dandy Wheat Feed & Screenings, 2; 1 too low in protein and too high in fiber; both contained ground weed seeds.

Success Middlings, 1; equaled guaranty.

Premo Baby Chick, 1; equaled guaranty.

Sedan Scratch Feed, 1; equaled guaranty.

Kentucky Star Scratch Feed, 1; equaled guaranty.

Kentucky Star Laying Mash, 1; equaled guaranty.

Premo Laying Mash, 3; 1 less than 3% alfalfa meal present.

Derby Horse & Mule Feed, 1; mixed wheat feed added.

Success Horse & Mule Feed, 4; equaled guaranty.

Kentucky Star Horse & Mule Feed, 1; equaled guaranty.

Premo Dairy Feed, 3; 2 too low in protein; 1 no rice bran present.

Kentucky Star Dairy Feed, 4; 1 too low in protein; 1 too high in fiber.

Marshall's 24% Dairy Feed, 3; 1 no rice bran present; 1 no linseed oil meal present.

Premo Hog Feed, 2; equaled guaranty.

Alfalfa Meal, Cane Molasses, Oat Middlings & Oat Hulls, 1; ground grain screenings substituted for oat middlings and oat hulls—misbranded.

King Midas Mill Co., Minneapolis, Minn. Inspection samples analyzed, 2.

Standard Feed & Screenings, 1; adulterated and misbranded as to ingredients.

Snowball Wheat Flour Middlings & Screenings, 1; too high in fiber.

Klarer Provision Co., Louisville, Ky. Inspection sample of Klarer 40% Digester Meat & Bone Tankage analyzed, 1; equaled guaranty.

Chas. A. Krause Milling Co., Milwaukee, Wis. Inspection samples analyzed, 4.

Kookoo Egg Mash, 1; too high in fiber.

Badger 16½% Sweet Dairy Feed, 1; no linseed oil meal present; contained distillers' dried grains, brewers' dried grains and corn gluten feed.

Amerikorn Dairy Ration, 2; too high in fiber; 1 contained oat product.

The Ladish Co., Milwaukee, Wis. Inspection sample of Lacto 16½% Sweet Dairy Feed analyzed, 1; contained excess grain screenings and weed seeds.

Lake Co. Manufacturing Co., Tiptonville, Tenn. Inspection sample of "Lake" 41% Choice Cottonseed Meal analyzed, 1; too low in protein and too high in fiber.

The Larrowe Milling Co., Detroit, Mich. Inspection samples analyzed, 4.

Larro, 3; equaled guaranty.

Dried Beet Pulp, 1; equaled guaranty.

Lawrenceburg Roller Mills Co., Lawrenceburg, Ind. Inspection sample of "Snowflake" Middlings & Screenings analyzed, 1; equaled guaranty.

Leitchfield Milling Co., Leitchfield, Ky. Inspection sample of Mill Feed analyzed, 1; equaled guaranty.

Lewisport Mill Co., Lewisport, Ky. Inspection sample of Farmers' Choice analyzed, 1; equaled guaranty.

Lexington Roller Mills Co., Lexington, Ky. Inspection samples analyzed, 5.

Thoroughbred Feed, 4; 3 too low in protein; 2 contained excess corn bran.

Thoroughbred Cow Feed, 1; too low in fat; contained ground wheat screenings.

Lookout Oil & Refining Co., Chattanooga, Tenn. Inspection samples of 41% Cottonseed Meal analyzed, 2; too high in fiber; 1 too low in protein.

Louisville Cereal Mill Co., Louisville, Ky. Inspection samples analyzed, 2.

Nonesuch Hominy Feed, 1; too low in protein.

Nonesuch Feed, 1; equaled guaranty.

Louisville Cotton Oil Mill, Louisville, Ky. Inspection samples analyzed, 8.

"Eagle Brand" 41% Choice Cottonseed Meal, 7; 1 too low in protein; 1 too high in fiber.

43% Cottonseed Meal, 1; equaled guaranty.

Louisville Feed Mills, Louisville, Ky. Inspection samples analyzed, 4.

Lincoln Horse & Mule Feed, 1; equaled guaranty.

Lincoln Dairy Feed, 3; too low in protein; 1 contained corn feed meal, wheat middlings, flax plant by-product and ground grain screenings—misbranded.

Louisville Milling Co., Louisville, Ky. Inspection samples analyzed, 6.

Sonny South Wheat Shorts & Screenings, 2; equaled guaranty.

Sonny South Mixed Wheat Feed & Screenings, 3; equaled guaranty.

Sonny South Hominy Feed, 1; equaled guaranty.

L. B. Lovitt & Co., Memphis, Tenn. Inspection sample of Lovit Brand 41% Cottonseed Meal analyzed, 1; equaled guaranty.

The Mann Bros. Co., Buffalo, N. Y. Inspection sample of "Argentine Brand" Pure Old Process Linseed Oil Meal analyzed, 1; equaled guaranty.

Marianna Sales Co., Memphis, Tenn. Inspection samples analyzed, 7.

"White Mule Brand" 41% Cottonseed Meal, 6; 2 too low in protein; 3 too high in fiber and contained excess hulls.

"White Mule Brand" 43% Cottonseed Meal, 1; equaled guaranty.

Mayfield Milling & Grocery Co., Mayfield, Ky. Inspection sample of Mixed Feed analyzed, 1; too low in protein; contained excess of corn bran.

Gentry McCauley, Versailles, Ky. Inspection samples of Pleez-U Dairy Feed analyzed, 2; much too low in protein and fat.

Memphis Cottonseed Products Co., Memphis, Tenn. Inspection samples of Durham 41% analyzed, 2; 1 too low in protein and too high in fiber.

Middlesboro Milling Co., Middlesboro, Ky. Inspection sample of "Hard to Beat" Mixed Feed analyzed, 1; too high in fiber.

Midget Milling Co., Providence, Ky. Inspection sample of Flavo Mixed Wheat Feed analyzed, 1; equaled guaranty.

Milroy Milling Co., Milroy, Ind. Inspection samples of Red Diamond Feed analyzed, 2; equaled guaranty.

Minneapolis Milling Co., Minneapolis, Minn. Inspection sample of Minneapolis Milling Co.'s Wheat Middlings & Screenings analyzed, 1; equaled guaranty.

Model Mills, Georgetown, Ky. Inspection sample of Mixed Feed analyzed, 1; too low in protein.

Model Roller Milling Co., Smith's Grove, Ky. Inspection sample of Mixed Feed analyzed, 1; equaled guaranty.

Morganfield Roller Mills, Morganfield, Ky. Inspection samples analyzed, 2.

Laying Mash, 1; no corn grits present; contained ground oats.

"White Rose" Mixed Feed, 1; equaled guaranty.

Morrison Milling Co., Glasgow, Ky. Inspection sample of Mixed Feed analyzed, 1; equaled guaranty.

Moss Milling Co., Greensburg, Ky. Inspection samples of Wheat Bran analyzed, 2; samples were mixed wheat feed.

Mountain City Mill Co., Chattanooga, Tenn. Inspection samples of Blue Cow Fine Feed analyzed, 2; contained excess of ground wheat screenings and weed seeds; 1 too low in protein.

Munfordsville Milling Co., Munfordsville, Ky. Inspection sample of Shipstuff analyzed, 1; equaled guaranty.

Myers & Barger, Columbia, Ky. Inspection sample of Mixed Feed analyzed, 1; equaled guaranty.

National Cottonseed Products Corporation, Memphis, Tenn. Inspection samples analyzed, 3.
Star Brand 41% Cottonseed Meal, 1; too low in protein and too high in fiber.
Planet Brand 43% Cottonseed Meal, 2; equaled guaranty.

R. N. Neal & Co., Memphis, Tenn. Inspection samples analyzed, 2.
"Triangle Brand" Prime 41% Protein Cottonseed Meal, 1; too high in fiber.
"Triangle" 43% Cottonseed Meal, 1; too low in protein.

The Newsome Feed & Grain Co., Pittsburg, Pa. Inspection sample of Palmo Midds analyzed, 1; equaled guaranty.

Nicholson Mills, Henderson, Ky. Inspection samples analyzed, 3.
Vita-Pure Scratch Feed, 1; too low in protein; ingredients not as guaranteed.
Vita-Pure 16% Sweet Dairy Feed, 1; equaled guaranty.
Vita-Pure 24% Dairy Feed, 1; too low in protein and too high in fiber.

Nolin Milling Co., Nolin, Ky. Inspection samples analyzed, 3.
Shipstuff, 1; equaled guaranty.
Mixed Feed, 1; too low in protein and fat; contained ground wheat screenings.
"Special" Mixed Feed, 1; too low in fat; contained corn bran.

W. C. Nothern, Memphis, Tenn. Inspection samples of Bee Brand 41% Cottonseed Meal analyzed, 3; equaled guaranty.

Nowak Milling Corporation, Hammond, Ind. Inspection samples analyzed, 6.
Marathon Laying Mash, 1; equaled guaranty.
Marathon Horse Feed, 1; only trace of alfalfa meal present.
Marathon Dairy Feed, 1; equaled guaranty.
Domino Butterine Dairy Feed, 2; equaled guaranty.
Domino 24½% Dairy Feed, 1; equaled guaranty.

Orange & Layman, Princeton, Ky. Inspection sample of Orange & Layman Special Laying Mash analyzed, 1; equaled guaranty.

Osborne Milling Co., Rineyville, Ky. Inspection sample of Wheat Bran & Middlings analyzed, 1; equaled guaranty.

Owensboro Milling Co., Owensboro, Ky. Inspection sample of Star Dairy Feed analyzed, 1; too low in protein.

Paducah Milling Co., Paducah, Ky. Inspection sample of Mixed Feed analyzed, 1; much too low in protein; too low in fat; contained finely ground corn product and ground oat hulls; adulterated and misbranded.

Park & Pollard Co., Chicago, Ill. Inspection samples analyzed, 5.
"Lay or Bust" Dry Mash, 1; no milo maize present; contained only traces of ground barley and ground kaffir corn.
Stevens "44" Dairy Ration, 1; no soybean meal present; contained oat shorts and oat hulls, and ground weed seeds.
Wizard Universal Ration, 3; 2 too low in protein and too high in fiber; 1 contained corn feed meal and no ground cocoa shells present; 1 contained wheat bran.

Parksville Roller Mills, Parksville, Ky. Inspection samples of Mixed Feed analyzed, 2; 1 too low in fat.

I. E. Payne, Eubank, Ky. Inspection sample of Shipstuff analyzed, 1; contained wheat screenings.

Pembroke Milling Co., Pembroke, Ky. Inspection sample of Mixed Feed analyzed, 1; too low in protein.

Philpot Mills, Philpot, Ky. Inspection sample of Mixed Feed analyzed, 1; too low in protein.

Phoenix Cotton Oil Co., Dyersburg, Tenn. Inspection sample of Phoenix Choice Grade 41% Cottonseed Meal analyzed, 1; too high in fiber.

Phoenix Flour Mill, Evansville, Ind. Inspection sample of Wheat Shorts & Screenings analyzed, 1; too low in protein; contained excess screenings.

Geo. P. Plant Milling Co., St. Louis, Mo. Inspection samples of "Circle P." Wheat Middlings & Screenings analyzed, 2; equaled guaranty.

R. C. Poage Milling Co., Ashland, Ky. Inspection sample of Standard Feed analyzed, 1; contained excess screenings.

Polo Mills Co., E. St. Louis, Ill. Inspection sample of Diamond Dairy Feed analyzed, 1; contained wheat bran and corn gluten meal.

Pratt Food Co., Philadelphia, Pa. Inspection samples analyzed, 9.
Pratt's Circle "A" Scratch Feed (large size), 1; only trace of milo present.
Pratt's Utility Large Scratch Feed, 1; less than 3% each of kaffir, milo, oats and buckwheat present; misbranded.
Pratt's Victory Laying Mash (with Buttermilk), 2; 1 contained ground bone.

Pratt's Supreme Laying Mash, 1; equaled guaranty.
Pratt's Supreme Growing Mash (with Buttermilk), 1; equaled guaranty.
Pratt's Supreme Horse Feed, 1; equaled guaranty.
Pratt's Victory Dairy Ration, 2; 1 contained corn feed meal and ground oats.

S. S. Price Co., Lexington, Ky. Inspection sample of Price's 30%, Tankage analyzed, 1; too low in protein.

The Quaker Oats Co., Chicago, Ill. Inspection samples analyzed, 10.
Ful-O-Pep Scratch Grains, 1; equaled guaranty.
Ful-O-Pep Egg Mash, 2; 1 too high in fiber.
Ful-O-Pep Chick Starter, 1; equaled guaranty.
Schumacher Feed, 1; less than 3% cottonseed meal present.
Sugared Schumacher Feed, 1; too high in fiber.
Buckeye Feed, 2; equaled guaranty.
Quaker Dairy Feed, 2; 1 contained excess of oat middlings and oat hulls; no bone meal present.

Ralston Purina Co., St. Louis, Mo. Inspection samples analyzed, 18.
Purina Baby Chick Chow Feed, 1; equaled guaranty.
Purina Hen Chow Feed, 1; equaled guaranty.
Purina Chick Startena Feed (with Buttermilk), 1; equaled guaranty.
Purina Chicken Fatena Feed, 1; equaled guaranty.
Purina Chicken Chowder Feed (with Charcoal), 2; 1 no gluten feed present.
Purina Pigeon Chow Feed, 2; 1 no corn present; 1 less than 3% millet present.
Purina Cow Chow, 2; 1 contained mixed wheat feed.
Purina Pig Chow Feed (with Charcoal 1%), 3; equaled guaranty.
Purina Omolene Feed, 3; 1 too low in protein; 2 too high in fiber.
Bulky Las Feed, 1; too high in fiber.
Checker Chops, 1; degermed; too low in fat.

Rapier Sugar Feed Co., Owensboro, Ky. Inspection samples analyzed, 9.
Rapier's Blue Hen Scratch Feed, 1; too low in protein.
Rapier's Blue Hen Laying Mash, 1; equaled guaranty.
Rapier's Red Wing Horse & Mule Feed, 1; equaled guaranty.
Rapier's Otene Horse & Mule Feed, 1; equaled guaranty.
Rapier's Teamster Horse & Mule Feed, 1; too low in protein.
Rapier's Creamo Dairy Feed, 3; 1 contained oat middlings and oat hulls—misbranded.
Rapier's Golden Rod Dairy Feed, 1; equaled guaranty.

Read Phosphate Co., New Albany, Ind. Inspection sample of "Read's Red Diamond" 60% Digester Tankage analyzed, 1; equaled guaranty.

R. D. Riedling, Louisville, Ky. Inspection sample of R. D.'s Feed analyzed, 1; contained ground weed seeds.

Riverside Mills, Adairville, Ky. Inspection sample of Mixed Feed analyzed, 1; equaled guaranty.

The Rossville Grain Co., Lawrenceburg, Ind. Inspection samples analyzed, 3.
Fortuna A-1 Dairy Feed, 2; equaled guaranty.
Kismet 16% Feed, 1; equaled guaranty.

Roszell Bros., Lexington, Ky. Inspection samples analyzed, 4.
Roszbro Horse Feed, 1; equaled guaranty.
R-B 16% Dairy Ration, 1; equaled guaranty.
Rex 20% Dairy Ration, 1; too low in fat.
Roszbro 24% Dairy Ration, 1; equaled guaranty.

Rudy-Patrick Seed Co., Kansas City, Mo. Inspection sample of Everyday Scratch Feed analyzed, 1; less than 3% sunflower seed present.

Salt Lick Roller Mills, Salt Lick, Ky. Inspection sample of Perfect Mixed Feed analyzed, 1; equaled guaranty.

Sandusky Bros. Co., Harrodsburg, Ky. Inspection sample of Mill Feed analyzed, 1; too low in protein.

Security Mills, Knoxville, Tenn. Inspection samples analyzed, 2.
Security Dairy Feed, 1; equaled guaranty.
Big "S" Horse Feed, 1; equaled guaranty.

Shrewsbury & Washburn, Caneyville, Ky. Inspection sample of Shipstuff analyzed, 1; equaled guaranty.

W. T. Sistrunk & Co., Lexington, Ky. Inspection sample of Sisco Sugar Dairy analyzed, 1; equaled guaranty.

Slaughters Milling Co., Slaughters, Ky. Inspection sample of Wheat Mixed Feed analyzed, 1; too low in fat.

Southern Feed & Grain Co., Louisville, Ky. Inspection samples analyzed, 7.
Eagle Scratch Feed, 1; contained wheat and only trace of barley.
Ideal Horse & Mule Feed, 2; no alfalfa meal present; 1 too low in protein; 1 contained wheat middlings.
Standard Horse & Mule Feed, 1; equaled guaranty.
Eagle Horse & Mule Feed, 1; contained ground grain screenings.
Ideal Sweet Feed, 2; contained corn by-product and wheat middlings.

Sparks Milling Co., Alton, Ill. Inspection samples of Try Me Mixed Wheat Feed & Screenings analyzed, 2; equaled guaranty.

Woodford Spears & Sons, Paris, Ky. Inspection sample of Mixed Feed analyzed, 1; contained excess screenings.

G. W. Stamper & Co., Vanceburg, Ky. Inspection sample of Wheat Middlings & Screenings analyzed, 1; equaled guaranty.

Star Milling Co., Clinton, Ky. Inspection sample of Mixed Feed analyzed, 1; too low in protein; contained excess of corn product.

The St. Louis Mills Co., St. Louis, Mo. Inspection sample of Gilt Edge Ninety Horse & Mule Feed analyzed, 1; equaled guaranty.

The Sugarine Co., Owensboro, Ky. Inspection samples analyzed, 18.
Record Scratch Feed, 1; less than 3% buckwheat present.
Universal Laying Mash, 1; equaled guaranty.
Sugarine Egg Mash with Buttermilk, 2; 1 too low in fat.
Record Horse Feed, 1; equaled guaranty.
Ideal Horse & Mule Feed, 1; contained excess of oat by-product.
Sugarine Dairy Feed, 3; equaled guaranty.
Sugared Feed, 1; equaled guaranty.
The National Dairy Ration, 4; 1 no peanut meal present.
Record Dairy Feed, 3; equaled guaranty.
Sugarine 32% Supplement Ration, 1; equaled guaranty.

Sunnyside Milling Co., Evansville, Ind. Inspection sample of Winter Wheat Shorts & Screenings analyzed, 1; contained excess ground wheat screenings.

D. B. Sutherland & Sons, Bloomfield, Ky. Inspection sample of Sutherland's Feed analyzed, 1; too low in fat.

Tell City Flouring Mills, Tell City, Ind. Inspection sample of Wheat Middlings & Screenings analyzed, 1; too low in protein; contained excess wheat screenings.

Texas Cake & Linter Co., Dallas, Texas. Inspection sample of Texoma Brand 43% Cottonseed Meal analyzed, 1; equaled guaranty.

Three Minute Cereals Co., Corno Mills Co., Prop., Cedar Rapids, Ia. Inspection sample of Corno Hygrade Oat By-Product Feed analyzed, 1; too low in protein.

Trenton Milling Co., Trenton, Ill. Inspection sample of "Easter Lily" Wheat Mixed Feed & Screenings analyzed, 1; equaled guaranty.

The Ubiko Milling Co., Cincinnati, O. Inspection samples analyzed, 5.
Ubiko Egg Mash with Buttermilk, 1; equaled guaranty.
"Union Grains" Ubiko Biles Ready Dairy Ration, 2; equaled guaranty.
Ubiko Special Dairy Ration, 1; equaled guaranty.

Fourex Dairy Ration, 1; too low in protein and too high in fiber; contained oat by-product.

United Bi-Products Co., Chicago, Ill. Inspection sample of Success Brand 60% Digester Tankage analyzed, 1; equaled guaranty.

United Mills Corporation, Grafton, O. Inspection sample of Grafton Wheat Middlings & Screenings analyzed, 1; equaled guaranty.

Upton Mill, Upton, Ky. Inspection sample of Mixed Feed analyzed, 1; equaled guaranty.

Vailer & Spies Milling Co., St. Louis, Mo. Inspection sample of Valier's Mixed Wheat Feed & Screenings analyzed, 1; equaled guaranty.

Walton Sanitary Flour Mills, Walton, Ky. Inspection sample of Big Bone Dairy Ration analyzed, 1; much too low in protein and fat; no dried brewers' grains present; contained ground wheat screenings.

The Washington Milling Co., Washington C. H. O. Inspection sample of Wheat Middlings & Scourings analyzed, 1; too low in protein.

Weisenberger's Sanitary Flour Mills, Midway, Ky. Inspection sample of Mixed Mill Feed analyzed, 1; too low in fat.

Alva West & Co., Maysville, Ky. Inspection samples of Mixed Feed analyzed, 2; 1 much too low in protein.

A. P. White & Co., Cadiz, Ky. Inspection sample of National analyzed, 1; contained excess wheat screenings.

Whitley Grocery Co., Corbin, Ky. Inspection samples of Jersey Cream Cow Feed analyzed, 2; 1 too low in protein; 1 much too low in protein and inferior to claim.

Winchester Roller Mills, Winchester, Ky. Inspection samples analyzed, 6.

O-Kay Scratch Feed, 1; less than 3% wheat present.

O-Kay Horse Feed, 1; too low in protein; no alfalfa meal present

Mixed Feed, 1; equaled guaranty.

Perfection Dairy Feed, 1; ingredients not as guaranteed—misbranded.

O-Kay Dairy Feed, 2; ingredients not as guaranteed—misbranded.

Woolcott Flour Mills, Lexington, Ky. Inspection samples analyzed, 4.

Woolcott's Mixed Feed, 2; contained excess screenings; 1 too low in protein.

Pride of Kentucky Dairy Feed, 1; equaled guaranty.

Alpine Dairy Feed, 1; equaled guaranty.

Pearl Young & Sons, Caneyville, Ky. Inspection sample of "Young & Sons" Feed analyzed, 1; too high in fiber.

Young & Bishop, Providence, Ky. Inspection sample of Mixed Feed analyzed, 1; equaled guaranty.

Roy Yount, Frankfort, Ky. Inspection sample of Benson Valley Dairy Feed analyzed, 1; contained ground grain screenings.

Zabel Milling Co., New Albany, Ind. Inspection samples analyzed, 4.
Mixed Wheat Feed & Screenings, 3; too low in protein and too high in fiber; misbranded.
Flour Middlings & Screenings, 1; equaled guaranty.

J. W. Zaring Grain & Mill Co., Richmond, Ky. Inspection sample of Bonanza analyzed, 1; equaled guaranty.